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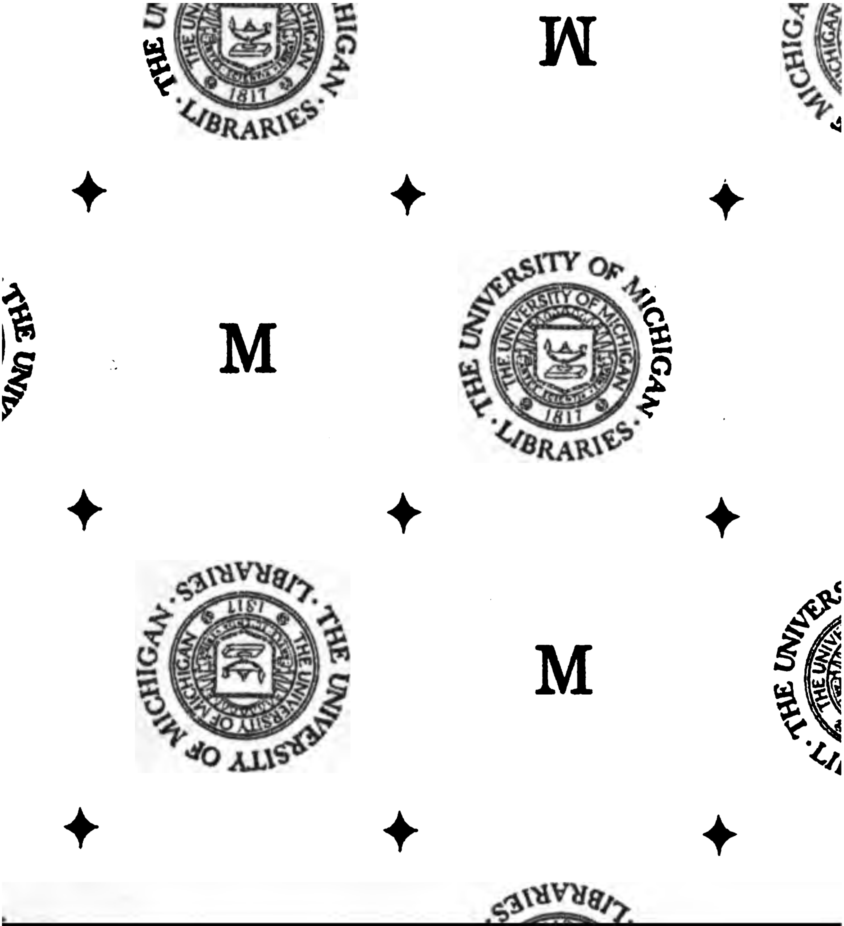
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# MONTHLY NOTICES
OF
# PAPERS AND PROCEEDINGS
AND
# REPORT
OF THE
# ROYAL SOCIETY
OF
# TASMANIA,
FOR
# 1879.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART.

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THE responsibility of the statements and opinions given in the following papers and discussions rests with the individual authors; the Society as a body merely places them on record.

# Contents:

Page.
Proceedings for April........................................................ 1
Brown, Rev. G., letter from. (Specimens from Hicks Island)............ 2
Wintle, S. H., Geological Specimens from West Bank of Tamar ......... 3
Library, Presentations to, by Dr. Milligan ..................................... 3
Proceedings for May ........................................................ 5
Gold from Kentish Plains........................................................ 5
Proceedings for June........................................................ 7
„ „ August........................................................ 9
Blue Gum and other Seeds for Cyprus and Algeria.......................... 9
Mt. Bischoff, Minerals from, presented by Mr. Sprent....................... 9
Codlin Moth, Letter from America on........................................ 10
Proceedings for September........................................................ 12
Codlin Moth, letter on, from the United States Entomologist ............ 12
Proceedings for October........................................................ 14
Platypus, The, Habits of, Discussion on........................................ 15
Proceedings for November........................................................ 16
Crinoid, Presentation of Specimen of........................................ 16
Society of Van Diemen's Land, Minute Book of, presented.............. 16
Armour, Japanese, Presentation of Suit of.................................. 16
Moscrop, Mr., on the use of ice retarding the development of fish ova... 17
Strawberry Plants, On the Beetle infesting.................................. 17
"Fossil, On the first secondary, found in Australia." By R. Etheridge, jun., F.G.S........................................................ 18
"Helices, Description of three new Tasmanian." By Lieut. Beddome, I.N. 23
"Amnicola (*Ampullaria?*) Tasmanica, Note on discovery of habitat of." By R. M. Johnston, F.L.S........................................ 24
"Spondylostrobus Smythii, Note on discovery of, at Brandy Creeek." By R. M. Johnston, F.L.S........................................ 25
"Tertiary Marine Beds of Table Cape, Third contribution to Natural History of the." By R. M. Johnston, F.L.S.......................... 29
"Flora of Tasmania, On recent additions to." By A. Simson............ 42
"Land Shells, Tasmanian, Notes on Distribution, &c. of." By R. M. Johnston, F.L.S........................................................ 44
"Codlin Moth, The." By His Honor Mr. Justice Dobson.................. 54
"Trochidæ, On some Tasmanian." By the Rev. J. E. Tenison-Woods, F.L.S., &c........................................................ 59
"Bythinella, &c., Notes on." By the same........................................ 71
"Rice, The Wild or Canadian." By F. Abbott, jun.......................... 73
"Codlin Moth, Notes on the." By A. Simson.................................. 73
"Travertin of Geilston Bay, Notes on." By R. M. Johnston, F.L.S.... 81
"Law of Storms, The." By the Right Rev. Bishop Bromby, D.D...... 91
"Platypus, Notes on the." By A. B. Crowther, M.R.C.S., Eng.......... 96
Meteorological Tables and Abstracts for Hobart..............................
„ „ „ New Norfolk........................
Plants of Tasmania, Census of. By Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S., &c. (Appendix.)........................................
Report of Society for 1879........................................................

# Errata.

Page 24.—4th line from top of page, for *A. M. Johnston* read *R. M. Johnston.*
Page 83.—14th line, the table referred to is attached at page 27.
Page 27.—Table of "Distribution of the Fossil Flora."
For *Contheca* read *Conchotheca*
" *Daphnogrua* read *Daphnogena*
" *De Werribeensis* read *Ditto Werribeensis*
" *Liversidgra* read *Liversidgea*
" *Oleiacrom* read *Oleiacron*
" *Auracaria* read *Araucaria*
Page 81 " *H. Tasmaniens* read *H. Tasmaniensis*
Page 83 " *biglandu losum* read *biglandulosum*

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# ROYAL SOCIETY, TASMANIA.

## APRIL, 1879.

A monthly meeting of the Society, the first of the session, was held on Tuesday, the 8th April. James Barnard, Esq., in the chair.

Mr. Morton John Cecil Allport was elected a Fellow, and William Tompson Bednall, Esq., of Adelaide, South Australia, a Corresponding Member of the Society.

The Hon. Secretary, Dr. Agnew, brought under notice the following returns, viz.:—

1. Number of visitors to Museum during January—On Sundays, 1332; week days, 1473. Total, 2805. February—On Sundays, 1036; week days, 1056. Total, 2092. March—On Sundays, 1066; week days, 918. Total, 1984.
2. Number of visitors to Gardens—January, 4743; February, 4932; March, 5371.
3. Plants sent from Gardens—To Mons. A. Verschaffelt, Ghent, Belgium, six tree ferns.
4. Seeds received at Gardens—From the Botanic Gardens, Saharunpor, India, 60 packets seeds. From Russell Young, Esq., seeds of *Cedrus deodar*. From the Chamber of Agriculture, Washington, U.S. America, 60 packets of seeds.
5. Books and periodicals received since the beginning of the year.
6. Presentations to Museum.

*Meteorological Returns* :—

1. Hobart Town—From F. Abbott, Esq., tables for January, February, and March.
2. Swan Island—Tables for January and February. Kent's Group—Do. for January. Goose Island—Do. for January and February. And Mount Nelson, for January, February, and March. From the Marine Board.
3. From Mr. Roblin :—" Tables of results of meteorological observations taken at Hobart Town and the various coast stations during the year 1878," compiled from the monthly tables furnished by Mr. Abbott, and the Hobart Town Marine Board.
4. Sydney, from the Government Observatory, printed table for July, August, and September, 1877.
5. From Government Observatory, Melbourne, ditto for September and October, 1878.

The presentations to the Museum were as follows :—

1. From Mr. S. J. Baynton :—Cases of *Teredo* and *Terebella* from the mud flats, North West Bay.
2. From Mrs. Martin, Kangaroo Point :—A fossil Pecten (locality uncertain).
3. From Mr. Smith :—Specimens of silicified wood, spiriferous mudstone and pebbles coated with a deposit of copper, from Southport.
4. From J. A. Moore, Esq., New Norfolk :—A Stone Axe from New Zealand, a large Club from Fiji, Boomerang and Waddie fram Billabong, N. S. Wales; two Boomerangs, a Shield, and two " Grave Stones," from Paroo, N. S. Wales; three Stone Axes from ditto.
5. From Mr. George A. Power, Ross :—Sample of Water and Mineral Deposit from the Ngawha Hot Springs, Ohaewai, New Zealand.

6. From Mr. S. H. Wintle :—Fossils from the west bank of the Tamar at Rosevear; Specimens of Auriferous Quartz from the "Little Wonder" claim, Brandy Creek (with a note).
7. From Mr. Burdon :—Three samples of a paper-like substance from the surface of the Hobart Town main reservoir. [A similar substance was found in large quantities on the surface of the Cascades reservoir in 1877. [Vide proceedings of the Society for 1877, pp. 8 and 58, *Conferva bombycina.*]
8. From H. S. Lewes, Esq. :—A Native Spear from the Lower Murray District, Victoria.
9. From Mr. T. W. Allen, Auckland :—A Broom cut from the solid wood, by a "King" native, New Zealand.
10. From G. Whitcombe, Esq. :—4 Silver, 17 Copper Coins, and 6 Medals; two Woodpeckers (*Picus viridis*) mounted.
11. From Mrs. Lodder, River Don :—425 Specimens of Tasmanian Butterflies and Moths. [Special attention was directed to this very beautiful and valuable presentation, for which the Society is indebted to the liberality of the collector, Mrs. Lodder.]
12. From Mr. Bett :—Specimen of a Species of Sting Ray, caught off South Arm.
13. From Mr. W. Cole :—Silicious Cast of Fossil Shell (*Spirifer*), showing spiracles, from the Peppermint Tier, Oatlands.
14. From Mrs. Stokell :—Skin of a Thoroughbred Bull-dog, imported from England by the late Dr. George Stokell, prepared and mounted.
15. From Mr. M. McNamara :—Two Diamond Snakes (*Hoplocephalus superbus*) from McRobie's Gully, near Hobart Town.
16. From the Rev. George Brown :—*a.* Geological Specimens from Hicks Island. *b.* Band and Coloured Flax Dress, from New Ireland. *c.* Specimens of Shell Money from Duke of York Island. *d.* 55 Specimens of Butterflies from New Ireland, &c. *e.* Two Skull Masks used by the natives of New Britain in their dances. *f.* A Chalk Figure from New Ireland.

The following note to the Secretary, from Mr. Brown, accompanied this presentation :—

"Port Hunter,
"Duke of York Group,

week the captain of the German ship of war Ariadne sent me a very flattering letter of thanks for what we had done.

"Yours sincerely,
"GEO. BROWN."

In reference to presentation No. 6, the following note from Mr. Wintle was read :—"When in Hobart Town recently, I left with Mr. Roblin a few fossils, etc., and promised him that I would write a letter respecting them.

"The specimens in question I found on the west bank of the river Tamar, at Rostreavor, at low water mark. They had been washed out of a tertiary clay deposit by river action, and were associated with numerous fossil fresh water mussels *(Unio).* The small slab of indurated clay, it will be seen, is of much palæontological interest on account of its presenting on one side an impression of the tongue-fern (*Glossopteris*), a cryptogamic fossil, which is typical of the Australian carboniferous period, while on the reverse side appears an external cast of a bivalve shell, which I am unable to identify, but which I cannot regard as an *Unio.* In all probability it is that of a marine shell. Accompanying it is an internal cast of what appears to be the same species of testacea.

"The apparently fossil pods, or seed vessels, are entitled to some attention as being associated with the former. I may mention that I submitted them to my friend and colleague, Mr. R. M. Johnston, while I was in Launceston, who like myself could not determine the supposed seed vessels, nor the shells, and confessed they were new to him. I would observe that the interest attached to these fossils is due to the fact that they afford unquestionable evidence of a very great change having taken place in the geology of the northern part of the island—at least since the Mezozoic Tertiary period. About that time a very extensive freshwater lake existed, not only in the northern part of Tasmania, but also stretching far south, and even, of which there is very strong evidence, extending to Victoria. As a consequence, the river Tamar could not have had existence at that time, nor indeed the river Derwent, nor Bass' Straits, assuming the hypothesis to be correct, which I feel assured there are few geologists who have studied the Tasmanian Tertiaries will doubt. This great change to existing geological conditions was, doubtless, effected by the extensive eruption of basalt during the Pliocene epoch of which such abundant evidence abounds.

"I seize this opportunity of expressing my deep sympathy with the Society in the loss it has sustained by the death of its most able, esteemed, and energetic member, the late Morton Allport, Esq. It is now that his usefulness is missed in a case like the present, to assist in determining fossil remains."

The following donations to the Library may be specially noted :—

1. From Dr. Milligan, F.L.S.—Jardine's Memoirs of Hugh Strickland, 1 vol.; Bewick's British Birds (1821), 2 vols.; Bewick's British Quadrupeds (1811), 1 vol.; Dr. J. Barnard Davis' "Thesaurus Craniorum" and Supplement, 2 vols.; Reprint of the Annual Summaries of *The Times* newspaper, for a quarter of a century ; sundry books and pamphlets on Prisons and Prison Discipline, etc.
2. From the Board of Inquiry, on the Diseases of Live Stock and Plants Queensland, "A Monograph of the Grasses of Queensland," by F. M. Bailey, F.L.S.

From America, per the Smithsonian Institution, Washington :—

1. From War Department, U.S., "Medical and Surgical History of the War of the Rebellion," part 2 ; Report of Reconnaisance, Montana Territory, 1 vol.
2. From the Department of Agriculture, 9 pamphlets.
3. From the Hydrographic Office, U.S., "The Coasts of Chili, Bolivia, and Peru." Catalogue of Charts. Tide tables, Pacific and Atlantic Coasts.

4. From U. S. Government, Bulletin of United States National Museum (1875-1877). Mississippi River, Report on Physics and Hydraulics of, etc.
5. From the Engineer Department, United States Army, "Descriptive Geology of the 40th parallel." Vol. 2, Palæontology of ditto, by F. B. Meek. Ornithology of ditto, by R. Ridgway. Microscopical Petrography, by F. Zirkel.
6. From F. V. Hayden, United States Geologist, Report of Geological Survey of the Territories, Vols. 7 and 9. "Palæontology," by F. B. Meek; Vol. II, "North American Rodentia," by Cones and Allen, 1877. Cretaceous and Tertiary Plants, Illustrations of, 1 Vol. Fur Bearing Animals; a Monograph of the North American Mustelidæ, by Elliott Cones. Annual report of Survey for 1875. Bulletin of ditto, Vol. 2 (nine parts). Indians, the Hidatsa, Ethnography, and Philology of 1877, etc., etc. [Many of these books, and those inincluded in presentation No. 5, are thick 4to. vols., profusely illustrated.]
7. Geological Age of the World, by J. M. Toner, from the Author. Public Health, Questions on, by the same. Also publications from the following learned bodies, viz.:—The Smithsonian Institution; the American Association for the Advancement of Science; the American Philosophical Society; the Essex Institute; the American Academy of Arts and Sciences; the Boston Society of Natural History, etc., etc.

The following papers were read:—

1. "On the identification of the First Secondary Fossil found in Australia," by R. Etheridge, jun., F.G.S. (of the Department of Geology, British Museum), a corresponding member of the Society.
2. Description of Three new Tasmanian Helices, by Lieut. C. E. Beddome, I.N.
3. Note on the discovery of the habitat of *Amnicola (Ampullaria ?) Tasmanica*, Tenison-Woods. With a description of a New Species of Helix. By R. M. Johnston.
4. Note on the discovery of *Spondylostrobus Smithii*, and other fossil fruits, in the "deep lead" drift at Brandy Creek, Tasmania. By the same.

## MAY, 1879.

A monthly evening meeting of the Society was held on Monday, May 12. His Excellency the Governor in the chair.

William Henry Burgess, Esq., Mayor of Hobart Town, who had previously been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society.

The Hon. Secretary, Dr. Agnew, drew attention to the following returns received since last meeting, viz:—

No. of visitors to Museum, April. On Sundays, 794, on week-days 929: Total 1723.

2. Ditto to Botanic Gardens, 4262.
3. Plants sent from Gardens. For grounds of Industrial School, Harrington Street, 100 Plants.
4. Seeds received at Gardens:—From Mr. H. M. Hull: Nine kinds of seeds of forest trees sent by the Exhibition Commissioners, Philadelphia. From Mrs. C. Meredith: 10 packets of seeds from Cashmere, including *Nelumbium speciosum.* From Baron Ferd. von Müeller: 14 packets seeds (various).
5. Periodicals received.
6. Presentations to Museum and Library.

*Meteorological Returns:—*

1. Hobart Town, from F. Abbott, Esq., Table for April.
2. New Norfolk, from W. E. Shoobridge, Esq., Table for April (abstract) —Monthly means of Observations taken during the year 1878.
3. South Bruni, tables for March and April, and Mt. Nelson for April. From the Marine Board.
4. New Zealand, from Dr. Hector, F.R S., etc.: Printed tables June to December, inclusive, 1878.
5. Adelaide, from C. Todd, Esq., C.M.G.: Printed tables for May, 1878.

The presentations to the Museum and Library were as follows:—

1. From J. Alun Jones, Esq.: A collection of ornaments made and worn by the Kaffir women, viz., necklaces, girdles, an apron, etc. Also a head ornament worn by the fighting men.
2. From — Atkinson, Esq., Latrobe, per the hon. D. Lewis: A sample of coarse gold. The following extract from a note from Mr. Lewis, in reference to this presentation was read:—"I have been requested by Mr. Atkinson, of Latrobe, to forward you for presentation to Royal Society's Museum, Hobart Town, a small sample of gold dust, obtained from land on the Kentish Plains, near the foot of Mount Roland, and about seven miles from the Mersey and Deloraine tramway. The gold is very similar to quantities I saw at Brandy Creek, and I was told was found nearly in the grass at the surface, and without any difficulty."
2. From Mrs. Stokell. Skull of a New Zealand Native.
4. From Mr. George Wilson, Huntsworth. A Specimen of Tartarean Oat. Dr. Agnew explained that the stalks—26 in number—of this splendid specimen were the produce of a single grain, and the number of grains in the head was considerably above a thousand. Of this oat Mr. Wilson had frequently grown, at Mount Seymour, as much as 100 bushels to the acre.

Library. 1. "Historical Records of Port Phillip." By J. J. Shillinglaw. From Government of Victoria.

2. "The Aborigines of Victoria." By R. Brough Smyth. From ditto.

The original contributions submitted to the meeting were numerous and interesting. The Secretary read a long and valuable paper, by Mr. R. M. Johnston, entitled "Observations on the Distribution and Variability of Tasmanian Land Shells."

Mr. T. STEPHENS read a paper, "On recent additions to the Flora of

Tasmania," by Mr. Augustus Simson. These additions consist of three plants new to the Colony, viz., *Hakea nodosa*, R. Br., *Helichrysum Spiceri*, Mueller, and *Eucalyptus Sieberi*, Muller. Specimens of the plants have been added to the Museum.

Mr. Justice Dobson read a paper on the Codlin Moth (Apple moth) This was a second contribution on the subject by the same observer, a former paper having been read in 1876 and subsequently published in the transactions.

Mr. F. Abbott also read a paper on the moth, giving at the same time extracts from English writers on the subject.

Discussion, in which His Excellency and others joined, ensued on the matter of the last two papers. Mr. Stephens thought much public benefit might be the result if a short digest were made of the information contained in the several papers which had been read before the Society on the subject of the codlin moth. Were this digest printed on a slip of paper it could easily, by means of the Post Office or otherwise, be brought under the notice of all apple growers, who would thus be furnished, in a very clear and concise form, with full information as to the best known methods of dealing with the pest. The suggestion met with the general approval of the meeting.

Mr. Abbott intimated that a valuable report on the Moth had been made by a Commission appointed by the American Government, and that he had made application for a copy.

A vote of thanks to the donors of presentations and the authors of papers, proposed by Mr. Barnard and seconded by Mr. Justin Browne, closed the proceedings.

## JUNE, 1879.

The monthly evening meeting of the Society was held on Monday, the 9th June. His Excellency the Governor in the chair.

Mr. Thomas Stone, who had previously been nominated by the Council, was, after a ballot, declared duly elected as a Fellow of the Society.

The SECRETARY, Dr. Agnew, brought under notice the usual returns for the past month, viz :—

1. Number of visitors to Museum; on Sundays, 743; on week days, 1,243; total, 1,991.
2. Do. to Gardens,—total, 3,859.
3. Plants, etc., received at Gardens. From A. Verchaffelt, Ghent, Belgium, 17 ornamental trees. From Messrs. H. Low, Clapton, London, 28 plants, etc.
4. Plants, etc., sent from Gardens. To Mr. J. Jones, Melbourne, one package of seeds. To Mr. George Brunning, Melbourne, one case of seedling plants, etc. To Mr. R. Harris, South Yarra, one ditto. To Mr. E. B. Heyne, Adelaide, one package of seeds. To Mr. S. Purchase, Sydney, one case of seedling plants and seeds. To Messrs. Shepherd and Co., Sydney, one ditto. To Mr. C. F. Creswell, Melbourne, one package seeds.
5. Books and periodicals received.
6. Presentations to Museum.

*Meteorology.*

1. Hobart Town, from F. Abbott, Esq., table for May.
2. From the Marine Board. Tables from Mount Nelson for May; Swan Island for March and April.
3. Melbourne, from R. J. L. Ellery, Esq., F.R.S., printed tables for January and February.
4. New South Wales, from H. C. Russell, Esq., B.A., F.R.A.S.—"Results of Rain Observations made in 1878." (Pamphlet.)

The presentations to the Museum were as follows :—

1. From Mr. John Brazier, Sydney, seven specimens of rare Shells, named, with list.
2. From Mr. A. K. Johnston, Etheridge River, North Queensland. A net bag made by Native women of the Gulf Country.
3. From A. Simson, Esq., George's Bay. Tubes of Salpa, with small Crustaceans found within them.
4. From Mr. Tonkin. A very perfect specimen of Spirifer from Mount Wellington.
5. From Mr. A. Winter. A photograph of the Museum Building.

The SECRETARY announced the receipt of the following publications :—

"Notes on the correlation of the Coral-bearing Strata of S. Australia, with a list of Fossil Corals occurring in the Colony;" "The Recent Marginellidæ of South Australia;" and "The Anniversary Address to the Adelaide Philosophical Society, 1878." By Professor Ralph Tate, Assoc. Linn. Soc., F.G.S., Lond., etc., etc. From the Author.

"Australian Trigonias and their Distribution." By W. T. Bednall. From the Author.

"Description of Seven new Species of Terrestrial and Marine Shells from Australia." By Jno. Brazier, C.M.Z.S. From the Author. "Transactions of the Royal Society of Victoria." Vol. 5. From the Society. "Report of the Philosophical Society of Adelaide, 1877-8." From the Society.

The Hon. W. A. B. GELLIBRAND exhibited a specimen of a seedling apple, which had been named the "Cleveland Pippin." This fine apple was raised from seed by Mr. Gellibrand, at Cleveland, about fifteen years ago, and has been worked on the stock, at South Arm and Sandy

Bay,—at the latter place by Mr. Lipscombe. It is a very prolific bearer, with excellent foliage, and has always hitherto been free from blight; where trees in the same garden have been utterly destroyed by this cause. It is admirable for dessert, and has the qualities and appearance of the Sturmer Pippin (though larger in size), and is also excellent for cooking purposes.

The **Secretary** read a paper "On some Tasmanian Trochidæ," by the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., Cor. Mem. Roy. Socs. Tas., N.S. Wales, Victoria, and the N. Zealand Institute.

His **Excellency** informed the meeting, as indicative of the attention now paid in other parts of the world to the Blue Gum, that he had recently received from the Consul General of Algeria a request for a supply of the seed. The request would immediately be complied with, and seed of the Silver Wattle would be forwarded at the same time. His Excellency had also recently received from Sir Garnet Wolseley a letter of thanks for a supply of Blue Gum and Silver Wattle seed for the Island of Cyprus, where Sir Garnet promises they shall have a fair trial.

Mr. E. **Swan** had noticed in a recent paper that the introducing of the Blue Gum to the Cape of Good Hope or to America had been attended with the drawback that certain insects had accompanied it, which had proved destructive to many of the indigenous trees.

Discussion ensued as to the comparative influence of deciduous and evergreen trees on soil and climate. It was suggested that Baron von Mueller might afford some interesting information on this subject.

The **Secretary** read a highly complimentary notice of the Society from the *Australasian* of the 7th instant, in a review of the published proceedings for 1877.

A vote of thanks, proposed by Mr. **Jas. Barnard**, to the Rev. J. E. Tenison-Woods, for his learned and valuable paper, and to the donors of presentations, closed the proceedings.

## AUGUST, 1879.

The monthly evening meeting of the Society was held on Tuesday, August 12, His Excellency the Governor in the chair.

Mr. Albert Wagenknecht, of George's Bay, who had been nominated by the Council, was balloted for and declared duly elected as a Fellow of the Society. The Hon. Secretary (Dr. Agnew) brought forward the following returns, received since last meeting :—

1. Number of visitors to Museum on Sundays, 874; on week days, 788; total, 1,662.
2. Ditto to Gardens, total 3,998.
3. Plants, etc,, sent from Gardens.
4. Time of leafing, etc., of a few standard plants in Botanic Gardens during July.
5. Books and periodicals received.
6. Presentations to Museum and Library.

*Meteorology.*—1. Hobart Town, from F. Abbott, Esq., table for July.

2. Coast stations, from the Marine Board, viz.:—Bruni Island, tables for April, May, and June; Goose Island, ditto March, April, May, and June; Swan Island, ditto May and June; King's Island, ditto February to June; and Mount Nelson, ditto for June and July.
3. Melbourne, from R. J. Ellery, Esq., F.R.S., printed tables for April, 1879.

The presentations to the Museum were as follows:—

1. From Mr. Wm. Nelson—A small collection of Fossils from the Limestone Quarries, Wauru Ponds, near Geelong, Victoria. (This collection consists chiefly of Sponges, Echinodermata and their spines, Sharks' teeth, etc., many of the specimens being in a beautiful state of preservation.)
2. From Mr. A. K. Johnston—A Girdle made of the fur of the Opossum, the only article of clothing worn by the native women of Northern Queensland.
3. From Mr. W. E. Shoobridge—A large specimen of "Native Bread" (*Mylitta Australis*), ploughed up at New Norfolk.
4. From Mr. A. J. Taylor—A cast of the skull of a criminal executed for murder.
5. From Mr. Frederick Thorne—A specimen of Tin Ore taken from 24ft. below the surface at the Montagu Tin Mining Company's claim, S.W. end of Mount Heemskirk.
7. From Mr. C. P. Sprent—About 150 specimens of minerals collected by the donor at Mount Bischoff, Mount Heemskirk, etc., etc.

Presentations of Books were also announced from the Trustees of the British Museum, the Royal Geographical Society, the Zoological Society, the Royal Institution of Great Britain, the British Association, the Geological Society of London, the Linnean Society, the Geological Society of Belgium, the Malacological Society of ditto, the Entomological Society of ditto, the Royal Colonial Institute, the New Zealand Institute, the Institution of Engineers and Shipbuilders in Scotland, the Asiatic Society of Japan, Mr. W. F. Petterd, Dr. Agnew, etc., etc.

Special attention was also directed to the elaborate and beautifully illustrated work on the Birds of Ceylon, lately acquired for the library. An interest external to its intrinsic worth attached to the book as it was the work of a Tasmanian, Captain W. V. Legge, R.A., son of our old and respected colonist, Mr. R. V. Legge, of Cullenswood.

The SECRETARY read the following extract from a note received by him from Mr. Calder :—

"I do not know if there be any table extant which records the first spring appearance of those birds that visit us every year; but whether or not, I believe it may interest you to know that one of those handsome birds known locally as Summer-birds (*Graucalus parvirostris*) was in my garden this day. I mean that handsome grey, slate-coloured bird, with black head, that is so numerous during the summer months in the open forest lands of Tasmania.

"31st July, 1877."

Mr. **Edward Swan** remarked that the 31st July was a very early date for the appearance of the Graucalus. He himself had seen the bird on the 4th inst., at Sandy Bay.

The **Secretary** read a paper entitled, "Notes on Bythinella" (a genus of fresh water shells), etc., by the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., etc., Corresponding Member Royal Soc., Tas., and President of the Linnean Society of N.S.W.

In the absence of the author, the **Secretary** read a paper by Mr. F. Abbott, Superintendent of the Botanic Gardens, entitled, "Notes on the Wild, or Canadian Rice." This paper was of a highly suggestive, and practical character, and the wish was expressed by several present that as much publicity as possible should be given to it. It was felt that the acclimatisation of the Zizania would no doubt realise most, if not all, of the benefits to be expected from its introduction. By several of the Fellows, the Lakes Dulverton and Tiberias and the Great Lake were suggested as localities where the experiment should be tried, but of the three it was the general opinion that Dulverton offered the most advantages as that locality would be more under supervision, and its entire surface was probably not too thickly covered by existing vegetation. A few small parcels of seed have been forwarded to the Museum for distribution.

The **Secretary** read the following note from Mr. F. Abbott, junr., with the communication to which it refers from the Departmentof Agriculture, Washington, U.S.:—

"The accompanying communication from the Chamber of Agriculture, Washington, relative to the Codling Moth, I received on Saturday last (9th August). No reference is made in it to any reports having been made by Commissioners or otherwise on the Moth, although I expressly asked for them, should there be any. The information supplied by the Department does not add much to our previous knowledge of this pest, but it confirms the fact of there being two generations in the year, and gives detailed instructions for the suppression of the Moth."

appear and lay their eggs, this time usually in the side of the apple. The larvæ winter in their cocoons, transforming to chrysalides the following spring. The universal remedy in this country is by the use of paper or hay bands around the trunks of the trees, these affording artificial places for the worms to transform. The following rules have been laid down for the use of these bands:—

"1st. The bands should be placed around the trees by the 1st of June, and kept on until every apple has been picked.

"2nd. They should be examined and all larvæ and chrysalides killed, every week, or at the latest every fortnight.

"3rd. The trunks of the trees should be kept free from old rough bark, so as to give the worms no other place of shelter.

"4th. The ground itself should be kept clean from weeds and rubbish. Experience has shown that common straw wrapping paper, folded into a band from 3in. to 6in. wide, and tacked around the tree midway between the first fork and the ground, makes as cheap and satisfactory a band as has been found.

"In addition to the bands it is advisable to feed all windfalls to the hogs.

"Very respectfully,
"L. O. HOWARD,
"Assistant in Entomological Division.

"Hon. W. G. Le Duc, Commissioner Agriculture."

Mr. STEPHENS read a paper on the same subject by Augustus Simson, Esq., of Gould's Country. Introductory to the reading Mr. Stephens remarked it was almost unnecessary to say that anything from the pen of the author on the matter now before the meeting carried special weight, Mr. Simson's acquirements as an Entomologist being superior to those of any other individual amongst us. For this reason he (Mr. Stephens) thought that, in addition to its general interest, the practical suggestions contained in the paper would be found of much value.

A special vote of thanks to the authors of the papers, and the usual vote to the donors of presentations closed the proceedings.

## SEPTEMBER, 1879.

The monthly evening meeting of the Society was held on Monday, 8th September; His Lordship the Bishop of Tasmania in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for and duly elected as Fellows of the Society; viz.:—The Rev. R. Rawson, M.A., of Richmond; the Rev. A. C. Newstead, George Town; and the Rev. Horace Graham, Hobart Town.

The following returns were brought forward by the SECRETARY (Dr. Agnew):—

1. Number of visitors to Museum during August, on Sundays 1,336, on week-days 1,162; total, 2,498.
2. Ditto to Gardens, 4,516.
3. Plants and seeds received at Gardens:—From Mr. G. Brunning, Melbourne, 36 plants. From the Victorian Horticultural Society, 100 varieties of scions of new fruits. From Mons. C. Huber, Paris, 36 packets of seeds.
4. Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during August.
5. Books and periodicals received.
6. Presentations to Museum.

*Meteorology.*—

1. Hobart Town, from F. Abbott, Esq., table for August.
2. Mount Nelson and Bruni Island, from the Marine Board, ditto.
3. Melbourne, from the Government Observatory, printed tables for May, 1879, and Results of Observations for 1876.
4. From the Meteorological Department of India, report from 1877-8; report of the Madras Cyclone, of May, 1877; Indian Meteorology, 1877.

The presentations to the Museum were as follows:—

1. From Mr. W. L. Boyes, a curious Crustacean from George's Bay.
2. From C. Allport, Esq., a Bittern (*Botaurus poicilophilus*) from New Norfolk.
3. From Bernard Shaw, Esq., specimen of Cement from the gold diggings, Beaconsfield.
4. From Neil Lewis, Esq., a Half-crown of William and Mary, 1689.

Department of Agriculture,
Division of Entomology,
Washington, D.C., July 8, 1879.

Mr. F. Abbott, Botanical Gardens, Tasmania.

Dear Sir,—Your letter to Commissioner Le Duc, containing questions concerning the Codling Moth has been referred to me.

The following is an epitome of the life history of this moth, *Carpocapsa pomonella* :—

The adult moth appears in early summer and lays its eggs on apples and pears, laying them singly in the blossom end of the fruit.

The larva, when hatched, eats its way to the core, usually causing the fruit to fall prematurely. When full grown, the larva burrows out through the side of the fruit, and undergoes its transformations within a cocoon, under the rough bark of a tree, or in some other protected place. This species is both single and double brooded.

The larvæ winter in their cocoons, transforming to pupæ during early spring.

The remedies are as follows :—Pick up and destroy the infested fruit as soon as it falls, or allow hogs to feed upon it; but by far the most effectual remedy is to trap the larvæ by providing a place for them to spin their cocoons. This may be done in many ways; the most effectual way is to put a band of hay or other material around the trunk of the tree. The trees should be scraped to remove the rough bark before the bands are applied, so that the larvæ will have no other refuge than the bands. The bands should be put upon the trees as soon as the apples begin to fall, and should be examined every two weeks and all the pupæ killed; this process should be repeated until the last apples are harvested in the fall. We use heavy coarse paper for band material, and either tie or tack them around the tree trunks. To have this remedy prove a *perfect* success concerted action is necessary among the neighbouring pomologists, as the moths fly from one orchard to another, more or less. As an instance of what concerted action can do, I will cite the experience of the Peninsula Farmers' Club of Grand Traverse, Mich. This club passed resolutions that all the orchards on the peninsula should be bandaged. In case the owners would not attend to it, the club bandaged the trees for them. The result was that although before they began seventy-five per cent. (75/100) of their fruit was destroyed by the Codling Moth, after three years' trial only five per cent. (5/100) was lost in that way. I feel quite confident that a similar experiment would succeed with you.

I should add that the orchards should be cleared of rubbish (old boards, etc.), that would afford hiding places for the pupæ.

The first remedy spoken of is only partially succesful, because about half the larvæ leave the apples before they fall, and crawl down the tree to find places to make their cocoons.

Yours, etc.,
J. HENRY COMSTOCK,
Entomologist.

In the absence of the author, the SECRETARY read a paper of considerable scientific interest, by Mr. R. M. Johnston, F.L.S., entitled "Notes on the relations of the Yellow Limestone (Travertin) of Geilston Bay, Hobart Town; with other fluviatile and lacustrine deposits in Tasmania and Australia, together with descriptions of two new fossil Helices." Regret was expressed for the writer's absence, as the Chairman noticed several of the points referred to by Mr. Johnston, which he thought were new, and would have afforded subjects for discussion.

A special vote of thanks was accorded to Mr. Johnston, and thanks having been voted to the donors of presentations, the meeting closed.

## OCTOBER, 1879.

The monthly evening meeting of the Society was held on Tuesday, October 14. His Excellency the Governor in the chair.

The Hon. Secretary, DR. AGNEW, drew attention to the following returns, received since last meeting, viz. :—

1. Number of visitors to Museum during September—On Sundays, 1,231; on week days, 1,278. Total, 2,509.
2. Do. to Gardens, 4,571.
3. Plants and seeds received at Gardens—From the Royal Gardens, Kew, 60 packets seeds. From Mons. C. Huber, Hyeres, France, 3 do. From Mr. S. Purchase, Sydney, 36 large Araucarias. From Mr. C. F. Creswell, 18 plants. From the Botanic Gardens, Melbourne, 6 packets palm seeds. From Mr. James Jones, 3 packets seeds. From Mr. James Dall, Nelson, New Zealand, 6 species Tree Ferns.
4. Plants, etc., sent from Gardens.—To Mr. C. F. Creswell, 36 plants. To Mr. James Jones, Melbourne, 36 do. To Botanic Gardens, Sydney, 2 bags Sphagnum moss. To Botanic Gardens, Melbourne, 2 do. To Messrs. Shepherd and Co., Sydney, 2 do. To the Acclimatisation Society, Queensland, 2 do.
5. Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during September.

HIS EXCELLENCY observed that this return supported some remarks he had made at a similar period of a former year, to the effect that in this country the sycamore and oak acted in a manner reverse of what took place in England. There the leafing of the oak followed that of the sycamore, whereas here the reverse was the case.

6. Books and poriodicals received.
7. Presentations to Museum.

*Meteorology.*

1. Hobart Town, from F. Abbott, Esq.—Table for September.
2. Mount Nelson and Bruni Island, from the Marine Board.—Tables for September.
3. Western Australia, from the Government Observer.—Printed report of Observations for 1879.
4. New Zealand, from Dr. Hector.—Printed tables for January, Febru-

The **Secretary** reported that the proceedings of the Society for 1878 were now ready for distribution to the Fellows on application.

The **Bishop** submitted specimens of the larva and chrysalis of the Codling Moth, taken from the tree the same morning.

Mr. **Barnard** exhibited eggs, larva, chrysalis, and fully developed insect of the Codling Moth, and read extracts in reference to it from Johnson's Cottage Gardeners' Dictionary, 1857.

Specimens of the Colorado Beetle *(Chrysomela decem-lineata)* were placed on the table for inspection.

The **Bishop** read a paper on the "Law of Storms," supplemented by a report on a Cyclone, which occurred between Tasmania and New Zealand in 1876, furnished by Captain Chandler, formerly of the United States steamer Swatara. The probable course of the Cyclone was illustrated by a chart.

Mr. A. B. **Crowther** read a paper on "The Habits of the Platypus." Discussion took place, when the conflicting theories as to the generation of the animal were noticed. After referring to the admirable investigations of M. Verreaux at New Norfolk, and the writings of Professor Owen (Annals of Nat. Hist., Vol. 2, 2nd series) thirty years ago, **Mr. Stephens** remarked that viviparous generation was generally accepted as a certainty.

Mr. E. **Swan** stated Professor McCoy was still of opinion that additional information was required before this point would be considered as finally settled. [In a paper on this subject, by the learned Professor, which appeared in the *Australasian* of the 10th August, 1878, the following passage occurs :—" The whole interest attaches to a very short interval, for the little naked young found by several observers could have only been a short time out of the egg, if such were really laid ; and on the other hand, at a period very shortly before this, the ova have been, by ourselves and many others, found in the ovaries as large as cherries ; but whether the young are excluded from the eggs while still within the body of the mother, and brought forth alive, so as to make the animal ovo-viviparous, as so many reptiles are, or whether the creature is oviparous, and the eggs are laid, and the young afterwards break out, as in all birds, is still the point to be determined."]

It was agreed that specimens of the female Platypus should, if possible be obtained during the next breeding season, commencing about the middle of November, at intervals of a fortnight. The gravid uterus, in various stages of development, could then be dissected here, or transmitted to Professor Owen, agreeably to his wish expressed to our late member, the Rev. W. W. Spicer, in 1877.

The **Bishop** read a paper on "Sewage and Health."

**His Excellency**, in confirmation of some points alluded to by the Bishop, adduced a striking instance of the value of the Earth Closet System. In a large prison at Fremantle, Western Australia, where the death-rate previous to his visit had been excessive, he (the Governor) directed Earth Closets alone to be used, and the effect was that the subsequent diminution of disease and death was most remarkable. Similar good results from attention to the closet system had also come under his notice in New Zealand.

Further discussion having taken place,

Mr. **Justice Dobson**, after alluding to the value and interest of the papers just read, proposed the usual vote of thanks, which was carried, and the proceedings then terminated.

## NOVEMBER, 1879.

The monthly evening meeting of the Society was held on Tuesday, November 11. John Swan, Esq., in the chair.

The Secretary (Dr. AGNEW) brought under notice the usual returns for the past month, viz. :—

1. Number of Visitors to Museum.—On Sundays, 798 ; on week days, 859. Total, 1657.
2. Do. to Gardens.—Total, 5356.
3. Books and periodicals received.
4. Presentations to Museum.

*Meteorological Returns.*

1. Hobart Town, from F. Abbott, Esq.—Table for October.
2. Mount Nelson and Bruni Island, from the Marine Board—Tables for October.
3. Melbourne, from R. J. L. Ellery, Esq.—Printed report for July, 1879.

The presentations to the Museum were as follows :—

1. From Mr. W. Legrand, Specimen of a Crinoid (probably *Pentacrinus Caput-Medusæ*), from the West Indies. [In reference to this presentation the Secretary read the following extract from Nicholson's Manual of Zoology :—" Of the living stalked Crinoids the best known is the *Pentacrinus Caput-Medusæ* of the Carribean Sea. More recently a stalked Crinoid has been discovered in the Atlantic and North Sea, and has been described under the name of *Rhizocrinus Lofotensis.* The chief interest of this form is the fact that it belongs to a group of the *Crinoidæ,* hitherto believed to be exclusively confined to the Mesozoic rocks, viz., the *Apiocrinidæ,* or " Pear-encrinites." In fact, *Rhizocrinus* is very closely allied to the Cretaceous genus *Bourgueticrinus,* and it may even be doubted if it is generally separable from it. The late remarkable researches into the life of the deeper parts of the ocean have brought to light several new Crinoids, which will doubtless, when fully investigated, still further fill up the interval between the living and extinct

The Secretary laid on the table a pamphlet, by Mr. Moscrop, of London, in which the writer lays claim to the discovery of the now well-known fact that the development of fish ova can be considerably protracted by the application of cold, by means of ice. [Mr. Moscrop's claim has been strongly denied, and further information on the subject will be adduced at next evening meeting.]

Mr. Augustus Simson exhibited several specimens of the beetle or perfect insect (*Otiorhynchus sulcatus*, Fab.), the grub of which has of late been so destructive to the strawberry plant. Mr. Simson had only looked for and obtained the insect on the previous day, and hoped soon to be able to furnish further information about it. In the meantime, as the beetle has not yet emerged from the cell in which it underwent its last transformation, the insect might to a great extent, if not altogether, be destroyed by taking up the dead plant, with the soil below it to the depth of three or four inches and burning it. At present the insect will be found mostly in a little cell in the Pupa or Chrysalis state, in which condition it is of course inactive. A few have not yet reached this stage and are still grubs, and some have recently become beetles. As this last change will take place rapidly in all when rain falls, no time should be lost in putting the above method of destruction into vigorous operation. The insect belongs to the family of the *Curculionidæ*, or "Elephant Beetles."

After further conversational discussion, the usual vote of thanks, proposed by Mr. Simson, and seconded by Dr. Crouch, was accorded to the donors of presentations, when the proceedings terminated.

# ON THE IDENTIFICATION OF THE FIRST SECONDARY FOSSIL FOUND IN AUSTRALIA.

By R. Etheridge, Jun., F.G.S.
(Of the Department of Geology, British Museum.)

[*Read* 8*th April,* 1879.]

In a paper entitled, "On the Carboniferous and other Geological Relations of the Maranoa District in Queensland, etc.,"* the late Rev. W. B. Clarke, F.R.S., wrote as follows:—"On the return of the late Sir T. L. Mitchell from his survey of the head of the Victoria, and on the subsequent return of the late Mr. Kennedy, I had an opportunity of inspecting a few of the specimens collected by them, consisting chiefly of fossil wood. . . After the publication of Sir T. Mitchell's report, I found that he had placed on one of his charts the word "*Belemnite,*" and as all his collections had been placed in the British Museum, I wrote to the Very Rev. Dr. Buckland the expedition,[1] deposited in the British Museum. He says, "The geological specimens collected during this journey have been deposited in the British Museum, etc."[2] The organic portion of this collection consisting of Molluscan remains in a *ferruginous* sandstone, silicified woods, and what I take to be the identical Belemnite referred to by the Rev. W. B. Clarke. This collection is now under my charge in the above Institution, and it affords me much pleasure in being able to be the means of again bringing to light this long-forgotten treasure. Forgotten, however, the specimens have not been by one person, my respected colleague Mr. Thomas Davies, F.G.S., in whose care the collection remained from the year 1848 to the time it was transferred to me, and who drew my special attention to it.

Mitchell's second journey was made, if I mistake not, in 1846, so that in the event of the specimen in question being that collected by him, the British Museum will have the satisfaction of possessing in its collection the first secondary fossil found in Australia.

Before describing the Belemnite it will perhaps be best to take a glance at certain events in the early history of Australian Geology, more particularly those referring to the discovery of secondary fossils.

In 1860 Mr. A. R. C. Selwyn reported the discovery of two specimens "imbedded in our Pliocene water-worn gravel near Melbourne. . . . Considered by McCoy to belong to decidedly chalk species. One is a very perfect Echinid, the other a fragment of a coral;"[3] this was of course written in 1859. The Echinoderm, which McCoy identified as *Conulus albogalerus*, the latter appeared to consider spurious, so far as their Australian identity was concerned.[4]

The Rev. W. B. Clarke informs us in his paper "On Marine Fossiliferous Secondary Formations in Australia,"[5] that during his own Explorations in 1851-58, he had received a portion of an Ammonite from the Clarence River district in New South Wales. This is probably the earliest discovery of secondary fossils in Australia, setting aside Sir T. L. Mitchell's Belemnite, although Mr. F. T. Gregory appears to have been the first to actually publish an account of such a discovery, for we find mentioned in an appendix to his paper, "On the

1. Journal of an Exped. into the Int. of Tropical Australia, etc., by Lt.-Col. Sir T. L. Mitchell, London. 2 vols. 8vo. 1848. 2. Vol. I., p. vii. 3. Quart. Jour. Geol. Soc. 1860. xvi., p. 148. 4. Trans. R. Soc. Vict. vi., 50.

5. Quart. Jour. Geol. Soc., 1867, xxiii., p. 7.

Geology of a part of Western Australia,"[6] *Trigoniæ*, *Ammonites* a *Pecten*, and a *Ventriculite*, as found in the neighbourhood of the Moresby Range. It was, however, only in 1862 that the Rev. Mr. Clarke's great announcement of the discovery by Mr. P. Gordon of a large series of fossils of secondary age on the Fitzroy Downs in Queensland was made,[7] and this was followed up in 1865 by Prof. McCoy's additional announcement of the discovery of certain Cretaceous forms at Walker's Table Mountain in Northern Australia.[8] It is unnecessary to continue this subject further, as enough has been said to show the general sequence in the progress of Secondary Palæontological Discoveries in Australia.

Let us now return to the collection made by Sir T. L. Mitchell during his second great journey. As before stated it consists of silicified wood, shells in ironstone, and a fragment of the "guard" of a Belemnite, besides rock and mineral specimens. The aspect of the Belemnite is so different from any of the other organic remains, that it at once arrested my attention when going over the series, and its identity became a matter of interest and importance. The specimen bears the ordinary label for the registration number used in the Department of Geology, British Museum, and bears the number 21,573. Upon turning to the old register of the department I found that the entry was made by Mr. G. R. Waterhouse, the present keeper of the Geological Department, and afforded the following information :—

| | | | |
|---|---|---|---|
| No. 21,573 | Belemnite, No. 27, of Sir T. Mitchell's Collection. | Presented by Sir T. Mitchell, Jan., 1848. | "From the Plains westward of Mount Abundance." |

It may not be out of place before concluding to refer to the published accounts of Australian Belemnites; the literature of the subject is not large.

Amongst the fossils obtained by Mr. P. Gordon on the Fitzroy Downs, and forwarded to Professor McCoy through the Rev. W. B. Clarke, was a Belemnite, presumed to be undescribed, and allied to *B. giganteus*, and which the latter desired might be called *Belemnites Barklyi*, in honour of Sir Henry Barkly, the then popular Governor of Victoria.[9] So far as I know it has not been described, and the name remains a MS. one.

The second reference we have to another individual of this group in Australian rocks is that by Professor McCoy, who described a species of the subgenus *Belemnitella*, under the name of *B. diptycha*, from the Cretaceous rocks at the head of the Flinders River in Northern Queensland.[10]

In Mr. Charles Moore's interesting paper on "Australian Mesozoic Geology and Palæontology," the late Professor Phillips, F.R.S., described a well-marked species of Belemnite, as *Belemnites australis*.[11] The specimen, of which the guard was the only portion preserved, was from the Upper Maranoa River District, and was considered by its describer to be most nearly allied to *B. hastatus* (Blainville), which is found in the Oxford clay of England. Another specimen appeared to be like *B. sulcatus* (Miller), also of the Oxford clay. In addition to these two several other fragments are either noticed or described in the same paper, one an individual with the "phragmocone" in position appears to be most nearly allied to *B. paxillosus* (Schlotheim), and is from Wollumbilla. The second specimen was considered by Mr. Moore to be *B. canaliculatus* (Schlotheim).

A tertiary species of Belemnite has been described from the South Australian rocks,[12] but as this is without the scope of this communication it need not be referred to here, except to point out that Professor McCoy has suggested,[13] that the remains so described may perhaps be those of a Pennatulid zoophyte allied to his *Graphularia Robinæ* from the Miocene beds of the Geelong district.

9. Quar. Jour. Geol. Soc., 1862. xviii., p. 246. 10. Annals and Mag. Nat. Hist., 1867. xix., p. 356. Trans. R. Soc. Vic., 1868. viii., p. 42.

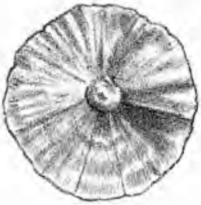
11. Quart. Jour. Geol. Soc., 1870, xxvi., p. 258. 12. Ibid, 1877, xxxiii. p. 257. 13. Prodromus Par., Victoria, dec. 5, p. 33.

## EXPLANATION OF THE FIGURES.

Fig. 1. Sir T. L. Mitchell's Belemnite, side view, nat. size. Near Mount Abundance (Mitchell Collection, British Museum.)

Fig. 2. Larger or anterior end, showing termination of alveolar cavity, nat. size.

Fig. 3. Smaller or posterior end, nat. size.



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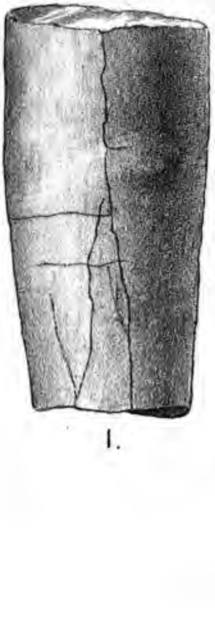

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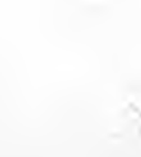

3.

# DESCRIPTION OF THREE NEW TASMANIAN HELICES,

BY LIEUTENANT C. E. BEDDOME, I.N.,

Collected on a trip from Chudleigh to Mount Bischoff, made by R. M. JOHNSTON, ESQ., T. R. ATKINSON, ESQ., and the describer.

[*Read April* 8, 1879.]

*Helix antialba.*—C. E. Beddome.

Shell umbilicated, concave on both sides, thin, covered with thread-like riblets, not shining, white to brown, spire deeply concave, nearly meeting the umbilicus, whorls 6½ slowly increasing, convex, last rounded, higher than broad, below ribbed as above, umbilicus perspective, deep, about ⅓ of the diameter of shell ; aperture, semilunar ; peristome, simple ; columella margin smooth and shining.

Diam.—Greatest, 2½ ; least, 2 ; heights, 1 mill.
Found in, and under decayed timber.
Habitat, Gad's Hill and Mount Bischoff, N.W. Tasmania.
Var., B brown, found only at Mount Bischoff, N.W. Tasmania.

*Helix Bischoffensis.*—C. E. Beddome.

Shell imperforate, flatly globose, whitish brown, very finely striated, the striæ crossed with very fine lines, giving the shell a granulated appearance ; spire roundly depressed, whorls 6½, slowly increasing, last rounded, descending, suture deep, aperture semilunar, peristome slightly thickened and reflected, columella smooth.

Diam.—Greatest, 2¼ ; least, 2 ; heights, 2 mill.
Found under dead timber.
Habitat, Gad's Hill and Mount Bischoff, N.W. Tasmania.

*Helix Gadensis.*—C. E. Beddome.

Shell with a large perspective umbilicus, equalling ¼ of its diameter, depressed, thin, horny yellow, whorls 4½, slowly increasing, regularly, finely striated above and below, suture deep, mouth ovately lunate, margins distant, joined by a very thin callus.

Diam.—Greatest, 2 ; least, 1¾ ; height, mill.
Found in and under decayed timber.
Habitat, Gad's Hill to Mount Bischoff, N.W. Tasmania.

# NOTE ON DISCOVERY OF THE HABITAT OF *AMNICOLA (AMPULLARIA?) TASMANICA*.—Ten. Woods.

## With a Description of a New Species of Helix.

By Robert M. Johnston, F.L.S.

(*Read April 8th*, 1879.)

**Helix Hookeriana.** n.s. A. M. Johnston.

Shell minute, planorbiform, bi-concave, somewhat openly perspectively umbilicated; whorls 4½ obliquely, arcuately striate, compressed, with alternate bands of red and brown; preceding whorls sunk in and closely embraced by the last, the base being rather more deeply submerged, and the upper surface shallower, and more openly perspective; aperture almost linear-lunate; labrum thin, obliquely produced towards periphery, and slightly inflated, forming a narrow groove at the sutures; arch of periphery faintly dilated into an obsolete keel.

Dia.—Max., 1·25 mil.; min., 1·75 mil.; height, 0·3 mil.

Habitat.—Twyforth Creek, Surrey Hills, on trunks of dead trees, under moss, and in the deep shade of luxuriant myrtle and sassafras foliage, *i.e. Fagus Cunninghami* and *Atherosperma moschata*. Rare.

Only four specimens of this unique little shell obtained. It approaches Petterd's *H. Barrenensis* in size and form, and

# NOTE ON THE DISCOVERY OF *SPONDYLOSTROBUS SMYTHII*, MUELL., AND OTHER FOSSIL FRUITS IN THE DEEP LEAD DRIFT AT BRANDY CREEK GOLDFIELD.

By Robt. M. Johnston, F.L.S.

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Through the kind interest of several friends, particularly Mr. Stockman, mining manager, and Mr. J. W. Brown, district surveyor, I have from time to time received fragments of Fossil Wood, principally a lignified Pine, with structure which appears under the microscope to be identical with lignified Pine remains at Breadalbane and elsewhere throughout the Launceston Tertiary Basin. These woods are obtained in sinking shafts to the "deep lead" at the Brandy Creek goldfields, about 40 or 50 feet from the surface, in a stratum of black carbonaceous clay. Recently, having directed the attention of the miners to look out for fruits, I was fortunate in securing a few tolerably well preserved specimens, one of which is undoubtedly the well known *Spondylostrobus Smythii*, Müeller, found abundantly in the "Haddon," and other deep leads in Victoria.

One of the others is most probably a species of Penteune, closely allied to the species found by the late Mr. Morton Allport, in the travertin at Risdon Quarry.

I submitted the fruits to Baron Von Müeller, who is praiseworthily investigating the paleophytology of Victoria and New South Wales, and he not only confirmed my opinion, but declared that in one of the drawings (No. 5), contained in my first paper to the Royal Society of Tasmania ("Regarding Comp. and Extent of Tert. Beds, Launceston," read 12th August, 1873), he believed he discerned the missing foliage of *S. Smythii*, so long unavailingly sought for in Victoria. He stated further that if I could find out whether the whorls were *quinary* he would feel justified in relating the various parts. Unfortunately, the specimen from which I took the drawing has crumbled to powder, but in a fragment of the Risdon Quarry travertin presented to me some years ago by the late Mr. Morton Allport, I believe I have discovered the same foliage, which is undoubtedly quinary. I have long ago arrived at the conclusion that the travertin beds at Risdon are closely related to the lower beds of the Launceston Tertiary Basin, from the identity of certain vegetable impressions. I have now to draw attention to the distribution of certain vegetable fossils in the adjoining table,* wherein, as well as from other evidences, we may be able to draw conclusions as to the close relation of strata associated with the Victorian gold drifts to the Launceston Tertiary Basin, the Risdon travertin, the Brandy Creek "deep lead," and to certain points in New South Wales.

It will be seen, therefore, that certain genera and species of the older auriferous drifts have had a very wide range, as it includes New South Wales, Victoria, Tasmania, and perhaps Queensland. It is to be hoped that those interested in the working of the mines at Brandy Creek will interest themselves in preserving the fruit remains, which ought to be found freely in the carbonaceous clays through which they sink. It may afterwards form a useful indication to our miners in search of the valuable metals, as well as add to our scientific knowledge of the flora of the early Tertiary period.

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* The names of fruits subsequently identified are also included.

# THIRD CONTRIBUTION
TO THE
# NATURAL HISTORY OF THE TERTIARY MARINE BEDS OF TABLE CAPE,
WITH A
# DESCRIPTION OF 30 NEW SPECIES OF MOLLUSCA.

By Robert M. Johnston, F.L.S.

[*Read 8th April*, 1879.]

The following record contains a list of 30 new species of fossil shells now described for the first time, from the Table Cape beds, together with a notice of the appearance of two described species still living, but hitherto unrecorded as fossils.

It is with a feeling of diffidence that I submit these descriptions to the members of the Royal Society of Tasmania, for I am very conscious of the many disadvantages under which I am placed, arising as much from inexperience in this special branch of study, as from the want of many necessary works of reference. The classification is so far provisional, that it is my intention to have it submitted to the Rev. J. E. Tenison Woods on the earliest opportunity.

Personally, I would much prefer that they were described by Mr. Woods himself, but his absence from the colony—the danger of transmitting to a distance fragile, unique specimens, not to speak of the rapidly increasing chaos of new material on hand—constrained me to publish my own private descriptive notes.

That valuable and splendid work "A Catalogue of Australian Fossils, including Tasmania and the Island of Timor," so carefully compiled from the scattered writings of various authors, by Robt. Etheridge, jun., F.G.S., has been of great service in enabling me to see what has hitherto been described elsewhere. Australian naturalists are under deep obligation to Mr. Etheridge for this most useful work, the result of years of patient labour. It adds another to the many valuable works so generously adopted by the syndics of the Cambridge University Press.

The following table may be of interest, as it shows at a glance how much has been done in the field of Australian Palæontology :—

## SUMMARY OF CLASSIFIED GENERA AND SPECIES,

*Roughly Abstracted from*

CAT. OF AUSTRAL. FOSSILS. BY ROBT. ETHERIDGE, JUN., F.G.S.

| | LOWER SILURIAN. | | DEVONIAN AND CARBONIFEROUS. | | MESOZOIC. | | TERTIARY. | | POST TERTIARY. | | DOUBTFUL. | | TOTAL. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Gen* | *Sp.* | *Gen* | *Sp.* | *Gen* | *Sp.* | *Gen* | *Sp.* | *Gen* | *Sp.* | *Gen* | *Sp.* | *Gen* | *Sp.* |
| KINGDOM. | | | | | | | | | | | | | | |
| Plantæ .......... | 2 | 2 | 14 | 19 | 18 | 41 | 26 | 35 | | | 1 | 1 | 61 | 98 |
| CLASS. | | | | | | | | | | | | | | |
| Rhizopoda........ | 2 | 3 | 2 | 2 | 6 | 9 | 25 | 45 | — | — | — | — | 35 | 59 |
| Hydrozoa ........ | 12 | 35 | — | — | — | — | — | — | — | — | — | — | 12 | 35 |
| Actinozoa ...... . | 20 | 32 | 22 | 50 | — | — | 17 | 40 | — | — | 1 | 1 | 60 | 123 |
| Echinodermata.... | 4 | 4 | 9 | 10 | 1 | 1 | 26 | 37 | — | — | — | — | 40 | 52 |
| Annelida ........ | — | — | — | — | 1 | 1 | 1 | 1 | — | — | — | — | 2 | 2 |
| Crustacea ........ | 17 | 28 | 7 | 10 | — | — | 4 | 4 | — | — | 1 | 1 | 29 | 43 |
| Polyzoa .......... | 2 | 2 | 8 | 24 | 1 | 1 | 20 | 61 | — | — | — | — | 31 | 88 |
| Brachiopoda ...... | 12 | 26 | 19 | 89 | 5 | 8 | 5 | 15 | 1 | 1 | 0 | 0 | 42 | 139 |
| Pelecypoda....... | 6 | 24 | 29 | 115 | 32 | 83 | 27 | 48 | 1 | 3 | — | — | 95 | 273 |
| Gasteropoda...... | 11 | 18 | 13 | 52 | 18 | 12 | 54 | 112 | 7 | 7 | — | — | 93 | 201 |
| Pteropoda ....... | 2 | 5 | 2 | 6 | — | — | — | — | — | — | — | — | 4 | 11 |

There are, according to the foregoing abstract, about 573 genera and 1280 species properly classified in Mr. Etheridge's catalogue, of which 217 genera and 416 species belong to the Tertiary period. The following list will raise the number to 236 genera, and 448 species.

The described Brachiopoda and Mollusca proper, of the Tertiary period alone, represent 100 genera and 207 species. In my own collection there are specimens or remains of at least 50 species still undescribed, making in all, say, 260 species, as far as I know.

The following fossils have living representatives, viz.:—

1. *Corbula sulcata*, Lamarck.
2. *Limatula subauriculata*, Montagu.
3. *Cucullea concamerata*, Reeve.
4. *Limopsis Belcheri*, Adams and Reeve.
5. *Do. aurita*, Brocchi.
6. *Pectunculus laticostatus*, Quoy and Gaimard.
7. *Cylichna arachis*, Quoy and Gaimard.
8. *Eulima subulata*, Donovan.
9. *Natica polita*, Tenison Woods.
10. *Crossea labiata*, Do.
11. *Trivia Europea*, Montagu.

Those having living representatives, according to this account, scarcely represent 2½ per cent of the fossil species included under the heading Tertiary period. In the foraminifera and lower forms of life, of course, evolutionists will expect to find a very much larger percentage, as the conditions for their existence are not liable to such marked changes as that to which the higher forms are subjected.

Our raised beaches have not yet been touched in Australia, so far as the classifier is concerned. On a future occasion I will prepare a list of those forms obtained by me from Badger and Barren Islands. I have already discovered one or two new forms which appear to have no living representatives.

I am indebted for the material from which many new Tertiary species were obtained to Mr. T. R. Atkinson, who has worked most enthusiastically in the investigation of the fossil remains at Table Cape. I am also under deep obligation to Mr. Petterd, who has placed at my disposal many undescribed new species recently dredged, for reference purpose.

The following are the new species referred to in the above introduction:—

**MUREX LEGRANDI**, *n.s.*

Shell small, fusiform, turreted, elongate, with numerous squamose spiny varices, of which there are upon penult, 9; on last whorl, 5; whorls angulate, showing 2 angulate carinæ on upper whorls, and 9 more or less angulate on body whorl; interspaces between varices and carinæ regularly cancellated by longitudinal and transverse liræ, which become slightly granular at points of intersection; the uppermost carina in each whorl is sharply produced into a crown of squamose spines where intersected by the varices; the spines are curved slightly upwards; aperture entire; anterior canal produced into a long open arched and recurved canal; outer lip denticulate interiorly. Long. 18, lat. 8, long. apert. 8 mil. Rare, Table Cape.

I have named this shell in honour of Mr. Legrand, who may be well termed the father of Tasmanian conchologists. The shell is easily known by its elongate appearance, and from the fact that the upper carina in each whorl is alone spinose.

**MUREX MINUTUS**, *n.s.*

Shell minute, white, shining, sub-fusiform, angulate; whorls (including smooth nucleus of 1½ turn), 6; lower whorls sharply angled at the crown by a row of bluntly angulate obsoletely squamose varices, which are thin and rib-like, and terminate near summit of whorl in a crown of blunt squamose tubercles, 7 on last whorl and 11 on penult; interspaces rather widely cancellated by broad, flat, slightly raised liræ, last two rib interspaces having 2 transverse and 6 spiral; aperture entire, terminating in a moderately long arched and slightly recurved canal; inner lip not terminating in a foliaceous rib; outer lip thick, slightly reflexed, dentate interiorly. Long. 8½, lat. 4½, long. apert. 5, lat. 2. Rare (2 specimens) Table Cape. This is a very distinct species, both in size and in ornamentation.

**FUSUS VITREOIDES**, *n.s.*

Shell broadly fusiform, of six smooth whorls; whorls sub-angulate near the middle, and ornamented with about 17 obsolete ribs, which disappear near aperture, and also in the upper part of each whorl, which latter is slightly concave spirally; apical angle aperture ovate-acuminate, narrowed into shortly produced anterior canal; outer lip thin, simple. Long. 42 mil., lat. 20 mil., long. body whorl 28 mil. Rare, Table Cape. This shell is easily known by its size and the absence of liræ.

**CANCELLARIA ETHERIDGEI**, *n.s.*

Shell small, with produced spire and exserted nucleus; not umbilicated; whorls 5, convex, distinctly ribbed on upper whorls;

ribs absent on body whorl; all of them crossed by rather coarse rounded liræ, which become obsoletely nodose at points of intersection with ribs; aperture narrowly ovate, with a slight anterior canal; columella abbreviate, distinctly biplicate; inside of outer lip distinctly denticulate. Long. 7mil., lat. 3 mil., long. aperture 2½mil. Rare, Table Cape.

**ADEORBIS LÆVIS**, *n.s.*

Shell white, minute, discoid, umbilicate of 3 smooth shining rapidly increasing whorls; aperture round; peristome simple, not reflected; umbilicus twisted, narrow. Dia. mag. 2mil., min. 1½mil., depth 1mil. Rare, Table Cape.

**RISSOA DUBIA**, *n.s.*

Shell simple, very minute, turbinate, perforate, of 4 round lax rapidly increasing whorls; suture deeply impressed; aperture sub-rotund, minutely umbilicated; peristome continuous; margin slightly reflexed. Long. 1mil., lat. ½mil. Very rare, Table Cape.

**RICINULA PURPUROIDES**, *n.s.*

Shell solid, small, subfusiform, turreted; whorls 6, angulate, ornamented and irregularly latticed by angulate ribs and carinæ; spaces between ribs and carinæ finely cancellated by spiral and transverse liræ; longitudinal liræ of two kinds, fine and coarse alternately; transverse liræ obsolete; carinæ on upper whorls, 2 central, 6 on body whorl; ribs regular, oblique, 11 on penultimate whorl, last rib varix-like; carinæ nodose at points of intersection; aperture narrowly ovate; anterior canal narrow, slightly reflexed and produced; peristome continuous; inner lip reflexed with 1 distinct linear tooth near posterior and forming two distinctly concave channels; columella, with about 8 small irregular teeth-like callosities; the largest of these callosities is situate upon a slightly swollen projection near to anterior canal; inside of outer lip with 7 raised teeth; outer margin slightly crenulate. Long. 13mil., lat. 6mil., long. aperture 6mil. Four specimens from Table Cape. This shell somewhat resembles *Purpura exsculpta* Dujardin in having a distinct tooth at posterior canal, but the presence of minute teeth-like callosities on columella brings it within the genus *Ricinula*, Lamarck.

**TRITON TASMANICUS**, *n s.*

Shell narrow, turreted, with elevated spire, and round blunt apex; whorls 8, cancellated and ornamented with about 24 fine riblets and 2 broad round distant varices on each whorl, which become slightly granulose at points where intersected by the more faintly raised regular carinæ, 6 of the latter visible on upper whorls; interspaces, varices, carinæ, and riblets finely transversely striate throughout; aperture entire, ending in short canal; outer lip denticulate interiorly. Long. about 22mil., lat. 8. Rare, Table Cape. This shell, though smaller, approaches very close to *T. tortuosum*, Reeve. I have, unfortunately, broken the aperture after it was partly described.

MITRA ANTICORONATA, *n.s.*

Shell small, narrowly ovate, rugose; whorls 7, sloping, slightly convex, spirally multilirate (12 on last whorl); liræ, regularly sub-distant on upper portion of whorl, but become more and more distant as they approach base; liræ intersected by sharp liræ-like riblets (25 on last whorl), giving a cancellate appearance to the shell, and becoming slightly granulose at points of intersection; suture faintly impressed; aperture ovate, scarcely exceeding the spire; anterior canal pointed, narrow; columella quadriplicate, the two central folds being most prominent. Long. 13, lat. 5, long. apert. 7, lat. 2. Rare (one specimen), Table Cape. This unique shell approaches nearly to *M. coronata*, Lamarck. It is much smaller than the *Mitra granatina*, Woods and Swainson, which latter name must be altered, as a very similar shell has been described and so named by Lamarck, and is figured in *Chenus' Manual of Con.*

PYRAMIDELLA POLITA, *n.s.*

Shell minute, white, turreted, shining; whorls, 6½, smooth, flattened; under 1-inch object glass, very fine longitudinal lines are visible, crossed with fine wavy liræ; base of last whorl somewhat truncate, with an indistinct sub-angular

### PYRAMIDELLA SULCATA, *n.s.*

Shell minute, white, shining, ventricose, with short acute spire; whorls, 6 convex; body whorl half the length of shell; with the exception of a rather wide space under impressed suture, the whorls are ornamented with regular equi-distant spiral sulci, 11 on last whorl; aperture ovate, nearly equalling spire in length; columella abbreviate, with 2 thick oblique plaits; outer margin thin. Long. 4mil., lat. 2mil. Long aper. 2 lat. 1. Rare, Table Cape.

### VOLUTA STEPHENSI, *n.s.*

Shell broadly fusiform, turreted; pullus moderately large, of about $1\frac{1}{2}$ turns; apical angle, 50° to 60°; spire conical of 5 whorls besides the pullus, each whorl ornamented with 14 to 18 angular sigmoid longitudinal ribs (14 on last whorl), extending from a point near the suture (from which they expand into a crown of more or less sharply angled tubercles) to the base, towards which the ribs tend to become obsolete; the tubercles on the last whorl expand almost at right angles to axis, and as they approach pullus they become less and less distinct; immediately under suture a second row of broad, almost obsolete, tubercles, surmount the larger row above the interspaces; the space between the rows varies, being slightly concave on the upper whorl, and almost deeply angular on the last; tubercular expansion on last whorl about 16mil.; nodes and interspaces finely striate with lines of growth; spiral lines indistinct or absent; mouth, with a slight posterior channel, oblong, narrowed in front; inner lip slightly curved,. with 4 slender rather angular equidistant oblique plaits; spaces between plaits concave; outer lip thin, simple, not expanded into a wing. Length 110mil., breadth of body whorl 55mil., relative length of body whorl $\frac{65}{100}$ relative length of penultimate whorl $\frac{15}{100}$. This is a very distinct shell, and differs from *V. Hannafordi*, McCoy, to which it bears some resemblance; in the smaller pullus, the more angulate appearance, and the absence of spiral striæ and expanded wing. Rare, only 1 perfect specimen found at Table Cape.

### VOLUTA ALLPORTI, *n.s.*

Shell large, ovately fusiform, of six regularly increasing whorls, besides a small pullus which is too imperfect in the various specimens for description; spire acute; apical angle 45 deg., slightly concave in outline; whorls slightly convex, and only ornamented with fine longitudinal lines of growth; aperture rather narrow, elliptical; lip not expanded into a wing, simple; columella curved, with 4 distinct slender oblique plaits; length, when perfect, about 8 inches, or

200mil., breadth 65mil., proportional length of body whorl about $\frac{65}{100}$ of penultimate $\frac{9}{100}$. This is the largest Volute in Table Cape Beds, and has much the general appearance of V. macroptera (McCoy) in its young state, but has a smaller pullus, and differs materially in the size, number of whorls, and in the absence of an expanded wing. Named in honour of the late Mr. Morton Allport, whose place in the field of Tas. Nat. History can never again be so fitly occupied.

**VOLUTA PELLITA**, *n.s.*

Shell narrowly fusiform, of six gradually increasing whorls besides the pullus, which is absent in the only specimen obtained; apical angle 45°; spire has a slightly convex outline; surface of whorls, of a shining leathery appearance, as if covered with raised, regularly sized microscopic glands; whorls also ornamented with slightly raised blue, undulating lines; aperture narrow, elliptical; lip simple; columella curved, with three distant distinct oblique plaits, the upper one being smallest and more transverse; length of shell without pullus 120mil., breadth 42mil., length of aperture 72mil., proportional length of body $\frac{70}{100}$, of penultimate $\frac{16}{100}$. This shell approaches the living *V. fusiformis* in shape and ornamentation.

**VOLUTA STOLIDA**, *n.s.*

Shell conoidal, ventricose, solid, mammillate; pullus smooth, of $2\frac{3}{4}$ turns, forming obtuse apex to spire; spire of 3 whorls besides pullus; apical angle about 80°; crown of each whorl with about 12 tubercles, sharp, angulate, and *stolida* occur together, and the former, though smaller, has one whorl more in the spire. The three shells are no doubt closely allied to each other. Rare, Table Cape.

### Voluta Tateana, *n.s.*

Shell slenderly fusiform, of 8 whorls, including the 2 turns of the smooth sharp pullus; spire very acute; apical angle about 30°; whorls with regular sigmoid ribs, which become somewhat obsolete downwards towards base of body whorl, and upwards towards suture, but are raised into distinctly angled tubercles, which form a spiral row near to the crown of each whorl; space between suture and row of tubercles slightly concave, and indistinctly marked with fine spiral liræ; tubercles slope abruptly upwards, and, with the ribs, become obsolete near to the lip of aperture; lip simple emarginate above; columella slightly curved, with 4 prominent oblique plaits; length 77mil., breadth 25mil., length of aperture 42mil., proportional length of body whorl $\frac{62}{100}$, 8 of penultimate whorl $\frac{13}{100}$, prop. br. of penult whorl $\frac{19}{100}$; shell finely striate longitudinally with lines of growth. This shell has the general character of the last, but is readily distinguished by its remarkably long slender appearance, its larger number of whorls, and sub-central apex. Rare, Table Cape.

### Voluta lirata, *n.s.*

Shell ovately fusiform, shining, of 7 whorls, including the smooth small pullus of $1\frac{1}{2}$ turns; whorls scarcely convex, and ornamented with fine slightly curved liræ, regular and distinct above, but becoming indistinct and irregular on body whorl; the interspaces are marked with very fine longitudinal lines of growth; spire, with a slightly convex outline, and forming an angle of about 50°; aperture somewhat elliptical, longer than spire; lip simple, emarginate above; columella curved, with 4 equi-distant distinct oblique plaits; length of shell 48mil., breadth 21mil., length of aperture 30mil., proportional length of body whorl $\frac{68}{100}$, of penult, whorl $\frac{16}{100}$. This shell approaches closely to *V. McCoyi*, but is lirate, larger and more ventricose.

### Voluta Agnewi, *n.s.*

Shell very small, narrowly fusiform, of 6 regularly increasing whorls, including smooth pullus of $1\frac{1}{2}$ turns, with pointed sub-central nucleus; spire very acute, with a somewhat blunt apex; apical angle 30° to 35°; whorls ornamented with 9 or 10 ribs, which become raised near the suture with a row of blunt tubercles; ribs on body whorl become obsolete towards the base; surface of shell finely cancellated, the transverse spiral lines being most conspicuous; aperture narrow, elliptical; lip thin, simple; columella slightly raised, with 4 regular slender oblique plaits; length of shell 23mil., breadth 8mil., length of aperture 12mil., proportional length of body whorl $\frac{60}{100}$, of penultimate $\frac{17}{100}$. This shell is, from its minute size, easily distinguished. It is undoubtedly the smallest volute in the Table Cape beds. Rare.

ZIZYPHINUS TASMANICUS, *n.s.*

Shell trochiform, conical, bluish, of 8 regularly increasing whorls; whorls scarcely convex, and ornamented spirally with sharply angulate equi-distant moniliform carinæ, about 8 on last whorl, decreasing in number towards apex; interspaces shallow, concave; and carinæ spirally covered with microscopic liræ; the whorls are also raised transversely obliquely into gentle undulating ridges, which are more pronounced as they approach the sub-angled base, where they are developed into rounded nodes; aperture quadrate; columella abbreviate, curved; inner lip callous, reflected over umbilicus, which it nearly conceals; base scarcely convex, with 4 fine scarcely-raised equi-distant liræ, which, together with interspaces, are covered with microscopic spiral lines; apical angle 70°; long. 30mil., lat. 24mil. Rare, Table Cape. This is by far the largest of the three fossil species described from Table Cape. There are fragments, however, of a very handsome species, too imperfect to be described, which must at least be 2½ times as large.

ZIZYPHINUS ATOMUS, *n.s.*

Shell thin, very minute, bluish, trochiform, conical, not the genus. It approaches in some respects the character of the sub-genus *Perinnia*, created by H. and A. Adams.

LIOTIA ROBLINI, *n.s.*

Shell small, discoid, spire depressed; nucleus somewhat sunk and flattened; whorls 4, ornamented with 6 to 7 sharply prominent regular longitudinal carinæ, which are crossed by sharply angled transverse ribs at regular intervals, 14 on last whorl; at points of intersection the longitudinal carinæ are projected into sharply angulate squamose nodes; interstices and nodes marked by fine sharp wavy striæ; aperture round, reflexed, with thickened margin; umbilicus deep, narrow, nearly closed by the lamellose nodes. Dia. mag. 6½mil., min. 5mil. Rare, Table Cape. This shell may possibly be the *L. discoidea* which the Rev. J. E. Tenison Woods describes as occurring at Table Cape. I cannot trace a fossil *L. discoidea* in my type collection. As some of the specimens were imperfect when submitted by me to Mr. Woods, it is just possible that it might be mistaken for the existing *L. discoidea*, to which it is closely allied, but differs in size, number of carinæ and ribs. Otherwise it has a marked resemblance to *L. lamellosa*, Ten. Woods.

PILEOPSIS NAVICELLOIDES, *n.s.*

Shell minute, depressed, subrotund; nucleus scarcely lax, exserted, of about 1½ smooth turns, submarginal; disk with rough uneven surface, concentrically irregularly striate; aperture ovate, closed at posterior margin by a spiral concave shelf, terminating on either side by a downward reflexed curve in the muscular impressions, which are well defined; margin uneven, simple. Dia. mag. 3½, min. 3, alt. 1. Rare, Table Cape, 1 specimen.

PORTLANDIA ATKINSONI, *n.s.*

Shell very minute, trigonal, subdeltoid, subnacreous interiorly, inequilateral; posterior slope truncated; surface of valves concentrically finely ridged, which increase in size and frequently anastomose towards centre and margin; ridges traversed by fine radial lines (visible also in the inner surface), which form a beautifully crenulated margin seen from the inner side of both valves; umbones sharply incurved; ligamental area inconspicuous; teeth, 6 on posterior slope, 10 on anterior, which increase in size towards middle of slope, the larger teeth slightly bent and lamellar; lunule shallow (scarcely defined), broadly lanceolate. Transverse long. 3¼mil., lat. 3¼mil., thickness of both valves 1½mil. Rare, Table Cape.

CUCULLEA MINUTA, *n.s.*

Shell very minute, thin, obliquely oval; hinge line straight, narrow, with 3 or 4 teeth oblique at extreme corners; surface of valves ornamented with fine radial ridges, and crossed by lines of growth; towards the margin the ridges are lamellar, and are also imbricated where intersected by the concentric lines of growth; margin finely crenulate; long. 3mil., lat. 2¼mil; thickness at umbo of both valves 1½mil. Rare, Table Cape. This shell is not unlike *Limatula subauriculata* in general appearance, being decidedly longer than broad. It differs materially from the young state of *C. Corioensis*, McCoy.

### MYODORA AUSTRALIS. *n.s.*

Shell trigonal, oblong, rounded margin; angle between slopes 118°; posterior slope considerably produced, almost horizontal, and abruptly truncately angled at outer margin of sinus area; sinus area distinctly angled flabellate; left valve ventricosely convex, with about 54 fine rounded concentric ridges; outer shell layer arranged in more or less regular radial rows, and composed of transverse linear-oblong microscopic cells, which become larger and less linear as they approach margin; right valve slightly convex, sharply and irregularly concentrically ridged, angled at distinctly marked sinus area; apical angle of sinus area 28°. Long. 14mil., lat. 17½mil., thickness of both valves 6mil., margin of sinus area 6mil. Common, Table Cape. Var. *A*. more finely ridged, and a smaller shell; contained angle between slopes, 110°. A very common shell, variable in size, but generally within the limits of the above varieties.

### MYODORA ÆQUILATERALIS, *n.s.*

broad slightly raised squamose radiating ribs, surmounted by a smaller ridge of distant lamellose spines; breadth of interspaces and rays equal; rays finer and closer together as they approach slope. Long. 50mil., lat. 35mil., alt. (both valves) 26mil. Rare, Table Cape.

CROSSEA LABIATA, *Ten. Woods.*

This shell has recently been discovered fossil in the Table Cape beds, by Mr. T. R. Atkinson. I have also discovered another specimen in a box of loose material which was brought from the cliffs at Table Cape by the same careful observer. The fossil species is larger than the living species.

ARCA TRAPEZIA, *Deshayes.*

This shell was also found fossil in the Table Cape bed by myself three years ago. The specimen was given to Mr. Woods, but he has omitted to refer to it. It is probably now in the Museum. I have fortunately taken a careful drawing of the specimen.

PECTUNCULUS LATICOSTATUS, *Quoy and Gaimard.*

Professor McCoy, in the "Second Decade Vic. O.R." has figured and described this shell, in which he states that it agrees in all respects with Quoy and Gaimard's original description of *P. laticostatus*. The surface of the Table Cape species differs, however, in having invariably 29 radial ribs—not 39, as in Professor McCoy's beautifully executed figure, and as stated in original description. A specimen obtained by me from Schnapper Point also shows 29 radial ribs. If there is no error in description (in p. 26, Decade II, Geol. Surv. of Vic.), and if the difference is a permanent and specific one, I would propose the name *Pectunculus McCoyi*, for the Table Cape variety. In all other respects it answers Quoy and Gaimard's description.

AMUSIUM ATKINSONI, *n.s.*

Shell very minute; equivalve suborbicular; ears unequal; dorsal and ventral surface slightly convex, and composed of a distinct layer densely regularly concentrically striated, frequently detached partly from inner smooth layer; inside of both valves concave, shallow, shining, with 10 smooth raised radiating riblets, which terminate truncately near margin; riblets not raised on dorsal or ventral surface, although they may be traced by faint dark pellucid lines. Long. 4, lat. 4. Rare, Table Cape.

# ON RECENT ADDITIONS TO THE FLORA OF TASMANIA.

By Augustus Simson.

[*Read 13th May*, 1879.]

At the instigation of Baron F. von Müeller I beg to lay before the Society specimens of a species of *Hakea*, not hitherto recorded in the Tasmanian Flora.

From the Baron's letter, which I send herewith, it seems that this plant is found in Gippsland, Victoria. I found it at George's Bay on my first visit in May, 1875, where it is of very frequent occurrence in marshy places, growing to a height of twelve (12) to fifteen (15) feet, or even higher. These shrubs occur also on Flinders Island, Bass' Straits, forming occasionally scrubs in wet places, and growing very closely together to a height of at least twenty (20) feet.

As Baron Müeller seems to think that the announcement of the discovery of new plants (or at least plants as yet unknown as Tasmanian, though possibly occurring in other countries) may encourage others to search diligently for more, I send also specimens of two other plants recently added to the Tasmanian Flora, one of which is quite a new species. These are:—

1st. *Eucalyptus virgata*, Sieber, or, as the Baron has re-named it, *vide* his letter, *Eucalyptus Sieberi*, Müeller, one of the species known in the colonies as "Ironbark." This fine tree grows to a height of one hundred (100) feet, with a before they stopped work. For bushmen, or those camped out in the bush, it has the great advantage of burning freely when green. The bark of all the species of this section burns fiercely; so much so, indeed, that in Northern Queensland the bark of the local species is used by blacksmiths for heating tires of wheels and other pieces of work too large to be placed in the forge, and I daresay this is the case in the other Australian colonies. To Mr. Thomas Stephens belongs the credit of having added this forest tree to the Tasmanian Flora, he having told me of it before I left town on my first visit to George's Bay, and stated his conviction that it was a species not hitherto known as Tasmanian, or possibly a new species altogether.

2nd. *Helichrysum Spiceri*, Müeller, a new species of the "everlasting" or *immortelles* flowers, which I discovered first in December, 1876, on the roadside, going from Longley towards the Sandfly coal seam. There was only one plant, which was bushy and covered with flowers.

The following December I passed the spot a second time, and found the same plant again in blossom. Unfortunately on neither occasion had I time to search for more specimens.

I have not yet seen Baron Müeller's description of this plant, nor do I know if he has yet published it. No doubt he will communicate the particulars to the Society in due time.

It is quite unlike any other *Helichrysum* occurring in this colony, and is a very pretty shrubby plant. It is much to be desired that any one residing in the vicinity, or passing by the locality, should search for more specimens.

The Society will, no doubt, be glad to hear that Baron Müeller has named this new species after the Rev. Mr. Spicer, as he says, "in acknowledgment of the exertions made by our reverend friend for the furtherance of Tasmanian Botany."

In conclusion, I hope the recent discovery of these three conspicuous plants, after the census of the Tasmanian Flora was supposed to be complete, may, by showing that there are still discoveries of new plants to be made, stimulate others to search carefully for other new species.

In the event of any plant not agreeing with the descriptions given in Mr. Spicer's "Handbook of the Plants of Tasmania," or in the more elaborate works of Hooker and Bentham, it is advisable in all cases to send the specimen to Baron Müeller, who will, no doubt, with his usual courtesy, give the name, or state whether the plant is of a species new to Tasmania.

GOULD'S COUNTRY, 29th April, 1879.

# NOTES ON THE DISTRIBUTION AND VARIABILITY OF TASMANIAN LAND SHELLS.

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By R. M. Johnston, F.L.S., &c.

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[*Read May* 12, 1879.]

Having visited many parts of our island but little known to the general traveller, I have, during the past few years, accumulated materials with respect to the distribution and variability of our land and fresh-water shells, which may be helpful in removing some of the existing difficulties in regard to classification.

Mr. Legrand's very excellent monograph, modestly called by him "A Collection for a Monograph of Tasmanian Land Shells," contains a full description of 83 species. Of these the greater part (55) were described by the eminent Australian conchologist, Dr. Cox, whose monograph of the Australian land shells, a work of the greatest value, is necessary to every one who desires to become familiar with Australian conchology. The remainder is described by well-known leading naturalists as follows, viz., Brazier, 16; Pfeiffer, 8; Reeve, 1;

our island fauna. In it he has added to the list about 30 species not embraced in Mr. Legrand's monograph, 4 of which were described by the Rev. J. E. Tenison-Woods, 17 by Mr. Petterd, 3 by Capt. Beddome, and one small but unique species by myself. Perhaps, however, the greatest credit is due to him for the effort to remove the difficulties, day by day on the increase, in connection with the existing classification. Many of the shells erected into specific distinction by Dr. Cox and others, require revision in the light of experience derived from the accumulation of large numbers of individuals, under various circumstances, and from many widely separated localities. Some of the species were described from single, or, at most, two or three individuals, and the extreme variability of certain forms has been the cause of confusion in that one or two varieties have been erected into specific distinction from immature specimens. As no one, however, can tell to what extent certain groups vary from one or two individuals, such mistakes are not only pardonable, but, if the descriptions are merely considered provisional, they are, historically, of the greatest advantage.

It was to be anticipated, therefore (indeed the authors state as much), that when other districts and a larger series of individuals were obtained, it might be necessary to reduce the number of species.

Until this was done it was impossible to say what were characters of specific value and what were not. It must not, therefore, be supposed that any reasons now adduced in support of the claims for a reduction of the number of species are intended to reflect upon the valuable work already done by those who had to do the best they could with scanty material. It is not an easy matter to tell what characters are of specific value and what are not even when the fullest information has been obtained as to the variability of the individuals of a group, and the greatest living authorities often come to different conclusions. It would be unreasonable, therefore, to expect, in the absence of the fullest knowledge respecting variation of size, colour, sculpture, distribution, that any author could determine, with accuracy, those characters which alone should entitle certain shells to specific rank. Of course I am aware of the difference of opinion which existed, and which even now exists in a more modified form, with respect to what constitutes a species and what a variety; but there is now, with few exceptions, sufficient agreement among the leading philosophical naturalists to leave little room for doubt in cases where the definition of a species is based upon the observation supply of food, and various other conditions." These latter, he adds, may be "permanent or local." When permanent he calls them *races*, but, as he himself remarks, it would "be difficult" to discriminate between a *race* and a *species*.

Now all this accents, with authority, the statement made by me in a former paper *re* variability of fresh-water shells, and the necessity for reduction of species; and it clearly supports the course which Mr. Petterd has adopted with respect to the reduction of certain species of our land shells, and which all along has had my hearty concurrence.

The result of recent investigations of Tasmanian land and fresh-water shells, based upon a careful examination of large numbers of individuals, of all stages of growth, from widely separated localities, with varying local surroundings, geological and botanical; and taken from levels varying in some cases from 1 to 4000 feet, may be easily glanced at by passing in review certain well-known typical shells and grouping them with certain varieties which have hitherto been regarded as distinct species, but which according to the laws determined by the consent of leading naturalists, must now, I am of opinion, be considered simply as varieties of one species.

Helix Stephensi (Cox), is perhaps within given limits the most variable shell in Tasmania, in size, colour, elevation of spire, and sculpture. It is also the most widely distributed, and is found in varying degrees of abundance under different circumstances, from sea level to a height of 4000 feet. It seems to be as much at home in cold, sterile, upland regions, as each other, in the same or in different habitats. The shells thus related are, H. Stephensi (Cox); H. Du Cani (Cox); H. Kingi (Br.); H. plexus (Cox); H. Irvinæ; H. Savesi; H. Pascœi (Br.); H. Floodi (Br.); H. spoilata (Cox); H. scrupulus (Cox); H. cœpta (Cox).

Mr. Petterd still retains the first three as distinct species; but I question very much the propriety of retaining more than one, as they are undoubtedly all varieties of one species.

It is remarkable the close resemblance which the fossil H. Tasmaniensis, from the travertin beds at Geilston, bears to the group of which H. Stephensi is a member in certain characters, especially in peculiarities of sculpture. The latter group may be considered its living representatives, and it is of the greatest interest to find that this dominant and variable type should have such an extension in time as well as in space, for it is thus another illustration of the accuracy of Darwin's statement that "wide ranging, much diffused, and common species vary most."

H. Diemenensis (Cox). — The species which rivals H. Stephensi in range, number of individuals, and variability is H. Diemenensis, and it scarcely falls short of the former in the number of species which have been created from its most unstable features. It varies in size, and is found in every stage from pure white to pale brown, and with or without more or less regular bands of colour. It varies, too, in one of its chief characteristics, viz., the more or less sharply excavated umbilicus. Between these described species which are purely varieties, there are trifling differences, and these are bridged over by individuals whose variations insensibly melt into each other as in the varieties of H. Stephensi. It is found fossil, and gives the principal character to the Helicidæ sandstone of Barren and other islands of the Straits. The allied species which Mr. Petterd justly reduces to the rank of mere varieties are H. Thomsoni, H. Daveyensis, H. Atkinsoni, H. Camillæ, H. Wellingtonensis.

H. Sinclairi.—This beautiful shell is also a most variable species in degrees of depression, and especially in its colour and markings; and no one who has examined a large suite of specimens can have failed to notice the extreme variability of the latter. It, also, has a wide range, and is found from the margin of high sea level to an altitude of 2000 feet. It is also found fossil associated with four extinct species in the yellow limestone at Geilston Bay, and may therefore be considered the oldest known living species of land shell in Tasmania. Three other species have been created from some of its varieties—H. dubitans, H. bombycina, and H. vexanda; but as there are links which insensibly connect them, they must also be reduced to the rank of varieties of H. Sinclairi, as suggested by Mr. Legrand and Mr. Petterd.

H. MacDonaldi (Cox).—Is a most abundant form, and has a very wide range. It is variable in size, form, density, and sharpness of striæ, and varies often from the prevailing form with its beautiful, regular, alternate bands of colour, by insensible degrees into a pure colourless variety. H. Juliformis, H. Gouldi, H. Kingstonensis, are merely varieties.

H. Stanleyensis (Petterd).—Varies in colour and band markings, in size, and in the density of striæ. It is allied to the former species, but there is a persistent characteristic difference in the sculpture of the nucleus. I am of opinion that Mr. Petterd's H. Tamarensis, which was originally discovered by me at the Rifle Butts, Launceston, is but an extreme variety of this variable shell. Hitherto it has been found near to the sea or some tidal river.

In the Helicidæ sandstone of the Bass Strait islands described by me in a former paper, I have discovered H. Stanleyensis in a fossil state associated with the fossil remains of H. Diemenensis, H. Pictilis, H. Furneauxensis, Vitrina, Verreauxi, Succinea Australis, and Bithynella nitida. The Helicidæ sandstone is of post tertiary age and of the same [redacted]

*TABLE showing the General Distribution of Tasmanian Land Shells, compiled from the Collections made at various times by W. Legrand, W. F. Petterd, Capt. Beddome, T. B. Atkinson, the Compiler, and others.*

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weldii (T.W.) ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | ... | ... | ... | ... | ... | |
| BULIMUS— | | | | | | | | | | | | | | | | | | | | | | |
| Dufresni (Leach) | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *c* | *a* | *a* | *a* | *a* | ... | G. |
| Tasmanicus (Pfr.) | ... | ... | *a* | ... | ... | ... | ... | *a* | *a* | ... | ... | *a* | *a* | ... | ... | ... | ... | ... | *a* | ... | ? | Coast line. |
| VITRINA— | | | | | | | | | | | | | | | | | | | | | | |
| Milligani (Pfr.)... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | ... | ... | ... | ... | ... | ... | ... | ... | W. |
| Verreauxi (Pfr.) | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | *a* | G. |
| fumosa (T.W.)... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | *c* | ... | ... | ... | ... | ... | N.W. |
| SUCCINEA— | | | | | | | | | | | | | | | | | | | | | | |
| Legrandi (C.) ... | ... | ... | *a* | ... | ... | ... | *c* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | S.E. |
| australis (Pfr.)... | *a* | *a* | ... | ... | *a* | ... | *a* | ... | *a* | ... | ... | ... | ... | *a* | *a* | ... | ... | ... | *a* | ... | ? | G. |
| TRUNCATELLA— | | | | | | | | | | | | | | | | | | | | | | |
| scalarina (C.) ... | *a* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | Bass Straits |
| Tasmanica (T.W.) | *a* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | Ditto |
| marginata (K.)... | *a* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | Ditto |
| micra (T.W.) ... | *a* | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | *a* | Ditto |

***a.*** **common.** ***b.*** **not common.** ***c.*** **rare.**

**ABBREVIATIONS.—B., Beddome. Br., Brazier. C., Cox. P., Petterd. R.M.J., R. M. Johnston. T.W., Tenison-Woods. K., Kuster. G., Generally distributed throughout Tasmania.**

are purely varietal, and are insensibly blended together in different individuals.

H. Legrandi (Cox).—Varies considerably in size, colour, and sharpness and density of striæ. I have found some varieties pure white. Mr. Petterd from these considerations has reduced H. Ricei and H. Onslowi to varietal rank under this species.

The following groups are also most variable in either size, colour, or sculpture:—

Group 1.—H. Jungermanniæ, H. sitiens, H. Luckmani, H. Hobarti, H. Morti, H. Furneauxensis.

Group 2.—H. Halli, H. Spiceri, H. parvissima.

Group 3.—H. Bischoffensis, H. limula, H. Otwayensis.

Group 4.—H. Nelsonensis, H. Dyeri.

Group 5.—H. Kershawi, H. Gadensis.

In the neighbourhood of Mount Bischoff H. antialba is generally of a brownish colour; near Gad's Hill it is pure white.

Bulimus Dufresni (Leach).—This shell is noted for its extreme range of variability in shape, size, markings, and prevailing colour. The longitudinal bands of colour are its most persistent feature, but these vary considerably. The Rev. J. E. Tenison-Woods has written a most interesting paper, with special reference to the variability of this widely-distributed form. I think, however, that one of the variations of form figured by him is due to comparison between an immature and a fully-grown individual. In the young state the shell is more orbicular than in the mature stage. Comparisons in general form should be made between shells which have not less than five whorls. Five and a half whorls indicate greatest development.

These are the principal forms which are apt to puzzle the classifier in the absence of the necessary particulars as regards distribution and variability; and the expression of the views recorded in this paper, whether they meet with general concurrence or not, will, I hope, be serviceable even to those who may still try to adhere to the original classification where its divisions are most arbitrary and perplexing.

In regard to distribution I may state, as a general rule, that the most variable species are the most abundant, and appear to have the widest range in time and space.

The following tables refer to the distribution of all the known forms of Tasmanian land shells, which are still retained by Mr. Petterd and myself as of specific value. As the south-western portion of the island has not yet been systematically investigated in any place, the absence of record from thence of wide-spread species may be taken as of no particular value.

On another occasion I intend drawing the attention of members to the distribution and variability of the fresh-water shells of Tasmania.

Shells widely distributed, and not confined to any particular district (22) :—Helix derelicta, H. Hobarti, H. Legrandi, H. Morti, H. Marchianæ, H. M'Donaldi, H. Nelsonensis, H. parvissima, H. pictilis, H. ruga, H. Sinclairi, H. Stephensi, H. subrugosa, H. Spiceri, H. Stanleyensis, H. Diemenensis, H. cœsus, H. Halli; Bulimus Dufresni, B. Tasmanicus; Vitrina Verreauxi; Succinea australis.

Shells hitherto found only in the N.E. district of Tasmania. —[Note.—The districts N.E., N. W., N., S., E., W., S.E., S.W., are determined by a meridian line drawn through Port Sorell (146 o) and 42 o parallel of latitude.]—(8) :—H. Jungermanniæ, H. Launcestonensis, H. Lottah, H. Mathinna, H. Officeri, H. Roblini, H. Trucanini, H. Tamarensis.

Shells hitherto found only in the S.E. district of Tasmania (12) :—Helix Bassi, H. Curaçoa, H. Gunni, H. Henryana, H. positura, H. Petterdi, H. pulchella, H. rotella, H. sitiens, H. Tasmaniæ, H. Vitrinaformis; Succinea Legrandi

Shells only found hitherto in two districts, S.E. and N.W.:—Helix Fordei, H. questiosa, H. dispar.

Shells reported from Tasmania but whose habitats are unknown:—Helix bisulcata, H. subangulata.

Shells common to other countries (10):—Helix cellaria (E.), H. Fordei (A.), H. Morti (A.), H. pictilis (A.), H. pulchella (E.), H. Otwayensis (A.) H. ruga (A.), H. Stanleyensis (A.); Vitrina Verreauxi (A.); Succinea Australis (A.)

[NOTE.—A. Australia, E. Europe.]

Land shells discovered in a fossil state:—

Miocene—Helix Tasmaniensis (G. B. Sowerby)—Yellow limestone, Hobart Town; Helix Huxleyana, n.s. (mihi), ditto; Helix Geilstonensis, n.s. (mihi), ditto; Helix Sinclairi (Pfr.), Helix Simsoniana, (mihi), ditto; Bulimus Gunni, (G. B. Sowerby), ditto;

Post Tertiary—Helix Diemenensis, Helicidæ sandstone, Bass Strait; Helix Furneauxensis (Petterd) ditto; Helix pictilis (Tate), ditto; Helix Stanleyensis (Petterd), ditto; Succinea Australis (Fer.), ditto; Vitrina Verreauxi (Pfr.), ditto.

# THE CODLIN MOTH.

By His Honor Mr. Justice Dobson.

[*Read* 12*th May*, 1879.]

Some time ago I called the attention of the Society to the devastation created by the larvæ of the codlin moth in the orchards in the Northern parts of the Colony. It has appeared in the orchards in the vicinity of Hobart Town during the last year to an extent that must alarm all those concerned in apple growing, and this is an extensive industry representing an export trade of not less than £40,000 a year. On the former occasion I pointed out something of the history and habits of the moth and its larvæ, but the all important question now is, how it can best be destroyed? After the moth has deposited an egg in the eye of the young apple, and it seldom deposits more than one egg in an apple, the egg hatches and the young creature eats its way through the tender skin of the apple at its eye, into the substance. The orchardist is not aware of its presence till he sees a dark spot on his apple, and then a hole from which the creature expels small grains of excrementitious matter which cover the orifice of the hole. It feeds on the pulp and attacks the pips, the most vital part of the apple, which then falls and the creature escapes through the orifice which it has made. Its exit is rapid, and many apples may be examined in the morning, which have [redacted] on still midsummer evenings. Possibly lanthorns or lamps might be used with effect. But, under any circumstances, the moth is less assailable than the grub or chrysalis. Several modes have been adopted for this purpose. Bands of hay are tied round the trunk of the apple tree before the apples begin to fall, and when the grubs ascend the tree they are said to find these bands a congenial shelter in which to form their cocoons and hybernate. These bands are, during winter, carefully collected and burnt, thus destroying all larvæ which may have taken up their abode in them. Another mode is by folding a strip of paper six or eight inches wide round the trunk of the tree, and then tying it tightly round with string at the upper part of the paper. The grub ascends the trunk, gets under the paper, and when it reaches the upper part where the string is tied round, its ascent is arrested, but it has a hiding place formed between the paper and the bark, and there rests and spins, and on removing the paper can be destroyed. There remains one other mode which I believe to be the most effectual. The grub does not, as a rule, ascend higher than its necessities drive it. Most trees have the roughest bark, and consequently the best and least laboriously attained shelter for the grub near the ground. There most of the grubs are to be found on removing the rough pieces of bark. This is best done with a piece of iron hoop ; a knife is too sharp and is apt to cut the under bark of the tree. The trunk of the apple tree is their natural abode, and there in their chrysalis state they are most easily destroyed. The chrysalis will gradually fall with bark when rubbed off, and this should be burnt or dug deeply into the ground. The grub will, especially in crowded and overgrown gardens, occasionally go up other trees or even hybernate in crevices in the wood of fences, but if all those in their natural abodes in the apple trees were destroyed, much would be done, towards keeping under this scourge of the orchard. The grub is at present (May 10) spinning its web in its home in the apple bark, and it is much more likely to escape if it is disturbed now, than if it is left till, becoming a chrysalis, it loses its powers of locomotion, and then has its home broken into by the careful gardener. In America, it appears, that the grub is not dreaded in young orchards, presumably because the bark of the tree is smooth and affords no shelter for the grub. The grub so skilfully excavates its nest and surrounds itself with a web, that it appears to me that it would be impossible by means of any ordinary external application of lime water or other liquid to destroy it. Slacked lime or flower of sulphur applied by bellows could not reach it in its secure and cunningly devised abode. The fumes of burning sulphur, if this could be confined round the trunk of the tree by some form of petticoat, would, no doubt, be as destructive to these creatures as it is to all animal life, but I am not aware that this has ever been tried. Apples which fall should be picked up as soon as possible, as the grub rapidly escapes, and they should be put into water, or other means should be taken to destroy the grub when it makes its exit from the apple. The moth deposits its eggs in others of the pyrus family as well as in the apple. It is, however, of little use for any one person to attempt to destroy the insect, unless his neighbours are also equally determined in their exertions to suppress this pest. One careless and slovenly gardener will afford a breeding ground for this creature, whence its progeny will carry devastation into the orchards of his neighbours.

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Mr. F. Abbott, Superintendent of the Botanic Gardens, said :—With reference to this moth I would offer a few remarks, with a view to disseminating information not readily accessible to many readers. The moth has been so long known that the details of its operations may be found in any work on gardening or horticulture, and it will not be necessary for me to repeat them here, but there are some points on which a difference of opinion exists, that it would be well to call attention to, with a view to having them cleared up. The first and most important is the belief held by many that there are more than one generation of the moth during the season ; the basis of any operations conducted for the suppression of this pest will be materially affected by the truth or otherwise of this statement. The following extract from Mackintosh's Book of the Garden, Vol. II., p. 345, may assist in throwing some light on the subject. After describing the moth, he goes on to state that it 'invariably selects the finest apple in which to lay its eggs, knowing instinctively that these will be most palatable to its future progeny. (In Tasmania the Golden Harvey is most affected). In favourable weather the little grubs are hatched in a few days, so that in May apples and pears may be found infested by them. At first the grub is white, with a black head and collar, and black slanting double dots which run in four rows from the head to the abdomen, it afterwards becomes more of a flesh colour, the head and collar turning brown, the dots grey and indistinct. It is fully grown in 3 or 4 weeks as its food never fails. It now leaves the fruit, whether it is hanging on the tree or has fallen off, and selects for itself a secure place on the describing the moth, its transformation and ravages, and declaring an experiment where the larvæ had gone through its various transformations while confined in a box. The author goes on to state, that, 'Our specimens did not appear in the winged state until July of the following year; but Reaumus says that they assumed the perfect state on the 15th of August, having been only a month from the time of their quitting the apples.' With a view of setting this point at rest it is very desirable that all having an interest in the matter should conduct experiments and make observation on it during the coming season, as it is only by united action that any definite conclusion can be arrived at. Although the presence of this Moth in the southern parts of the Island is of recent date, it has been in the northern for more than 20 years. Its prevalence in Hobart Town is attributed by many to some infected plums which were received from the North a few years ago. If this is really a fact it is a curious one, for I am not aware that the codlin moth is known to attack plums in England or America; there is, in both countries, a special moth, Tortrex or Carpocapsa nigricana which attacks plums to a serious extent, eating nearly into the stones, and causing the plums to fall prematurely. Whether it is possible that the two are present in Tasmania, and are confounded together in our orchards I am not prepared to say. It is a point that can only be satisfactorily determined by securing some of the infected plums next season, and confining the larvæ till the moth appears, when it would be easy to determine to what species it belongs. Perhaps the information that would be most acceptable just now, to the majority of readers would be such as would enable them to subdue or check the spread of the moth. I am conscious of being unable to suggest anything new on this head, and can only repeat such as are well known to most cultivators. Perhaps the most effectual is that of attacking the larvæ in their homes; this may be done in the winter months, by thoroughly scraping (with some blunt instrument, such as a ship's deck scraper) all the loose bark and *effete* matter from the trees; this should be thoroughly done, using actual force in some cases to tear off the old bark, when this has been done the loose bark should be collected and burnt to make sure of destroying the larvæ. The tree should then be dressed, on such parts of it having cracks or fissures, with some mixture that will set sufficiently hard to prevent any larvæ that may have escaped from obtaining an exit. There are many mixtures that may suggest themselves, but perhaps the following is as good as any:—Mix powdered dry clay with sufficient coal tar to form a thick paint, and work this mixture well into all cracks or crevices with a painters' brush. If this operation is properly performed there will be very few larvæ on the trees that will escape. A method commonly adopted in the spring or early summer months for destroying the moths is that of suspending lanterns in various parts of the garden with a view of decoying the moths. The lanterns should be smeared with some glutinous substance such as linseed oil, or have a saucer of the same suspended beneath them. In England and Wales lanterns for this purpose are often constructed by tying a few willow or other twigs into a frame resembling in shape a Chinese lantern, placing a piece of clay in the angle of the willows just above the bottom ties in which to stick a piece of candle; the frame is then surrounded by a sheet of cartridge paper which is kept smeared with oil during the season the lanterns are in use; the moths attracted by the glare become immersed in the oil, and are thus destroyed. A third well-known method is that of gathering up without delay the fallen apples and scalding or otherwise destroying any larvæ they may contain. This method to be of any use, should be persevered in at very short intervals, as the grub, if indeed he has not already done so, quits the apple almost simultaneously with its fall, and if any delay takes place the operation will be futile. Although it is generally supposed that the larvæ select the stem of the tree on which to secrete itself and become a pupæ, yet this is by no means essential, they will crawl into any crevices affording the requisite amount of shelter, and thus old fences and pools are often thickly studded with them. I have with me a portion of an old post cut recently from the fence of a garden in town, in which several larvæ may be plainly seen and such places should not be lost sight of when steps are being taken to destroy and lessen the evil. In America various kinds of collar are placed round the base of the trees with the view of intercepting the caterpillar when in search of a safe resting place, sometimes a simple hay band is used, the object in every case being to encourage the larvæ to locate itself within the collar where it can easily be destroyed.

# ON SOME TASMANIAN *TROCHIDÆ.*

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., Corr. Mem. Roy. Soc. Tas., N.S.W., Vict., and N. Z. Inste.

[*Read* 12*th August*, 1879.]

In the Proceedings for 1877 this Society did me the honor to publish in its pages a Census of the Marine Shells of the Tasmanian coasts. In that list I discussed some of the claims of certain species, but a great many questions connected with the classification I was obliged to leave untouched. I now propose to deal with the names of some of the *Trochidæ*, and the validity of certain genera as regards those Tasmanian species which are included in them. It will be observed that in many cases I have remarked in the Census that I did not consider certain genera as very reliable. I do not know any family to which this is so applicable as to the *Trochidæ*, and for the present I shall confine my remarks to them.

The family of *Trochidæ*, as defined by Messrs. H. and A. Adams, and whose divisions I shall follow, is meant to include animals with an elongate tongue, median teeth broad, laterals five, denticulated; uncini very numerous, slender with hooked points; head proboscidiform; tentacles subulate, somewhat ciliated; eyes on free peduncles on their outer base, two more or less developed head-lobes between the tentacles, gill single, long, linear. Sides of the foot with a large neck-lappet near the eye peduncle, continuous with a conspicuous side membrane bearing on its free margin, from three to five tapering filaments. Operculigenous lobe often ornamented with cirrhi. Operculum horny, spiral, with a solid convex calcareous coat, which is rarely wanting. Shell pyramidal, turbinate or em-shaped. Aperture pearly within.

I subjoin the remarks of Messrs. Adams, which have a special interest and value to all who observe the habits of the animal. They say that the Trochoid scutibranches embrace an extensive series of herbivorous littoral mollusca characterised by the fringe lobes and tentacular cirrhi of the head and sides, their pedunculated eyes, and by the pearly nature of their shells, which exhibit a brilliant color when the periostraca and outer coat are removed. They are invariably marine, feeding among the seaweeds which abound along the shore, and are distributed universally over all parts of the globe, being most numerous, of larger growth, and more beautiful color in tropical seas. The shells of the *Trochidæ*, though formed on one type, assume a great variety of contour and sculpture, being turbinate and provided with stony opercula in some (*Phasianella*), cancellated and discoidal with horny calcareous opercula, in *Liotia* conical or pyramidal with horny multispiral opercula in Trochinæ, with the opercula uniting in *Stomatellinæ*, which section gradually leads to the *Haliotidæ*, in which the branchial plumes are symmetrical, the muscle of attachment is central, and the mouth is fissured in front.

Sub-family Eutropinæ.—This family is erected for one genus of which our *Phasianella* is the type. Messrs. Adams insist on giving the name of *Eutropia*, because that was the one first applied by Humphrey. In answer to this it must be noticed that Humphrey is not entitled to priority, as he published no definition of his genus. Secondly, Lamarck's name is generally received and adopted by conchologists and by geologists. It is not at all likely that the latter would ever consent to the change, and Continental naturalists have refused to receive it. Confusion, therefore, would only result from following Messrs. Adams or Mr. G. F. Angas in this matter.

The second sub-family is *Turbininæ*, including turbinate shells with the last whorl ventricose, aperture sub-circular, inner lip smooth and simple. Operculum horny, with a solid, convex, calcareous coat.

Genus *Turbo*, Linnæus.—This is one of the oldest genera, dating back as far or as early as Rondel (Universæ aquatilium smooth operculum. If the species is what Messrs. Adams consider a true *Lunella* it is at best only a sub-genus like *Senectus*, according to Chenu.

*Ninella* is a genus proposed by Gray in 1850, for two species especially distinguished by two spiral raised ribs on the operculum. It does not seem admissible to found a genus on the shape of the operculum alone, and this one would if admitted be found very inconvenient. The other features referred to by Messrs. Adams would be included in several genera. We have amongst the two enumerated *Turbo straminea*, but only very rarely seen upon the north coast.

Our next genus is CARINIDEA, which was proposed by W. Swainson as a sub-division of *Canthorbis*. He thus defines it:—"Imperforate, spire pyramidal, acute, basal whorl concave beneath, carinated round its circumference, aperture oval entire, slightly angular at the base of the pillar, which turns inwards." Chenu in his "Manual" gives quite another definition, making it a sub-genus of Polydonta. By some it has been identified with *Uvanilla*, a genus of Gray's (Sys. Arr. Moll., p. 144); but Gray distinctly says shell top-shaped, imperforate with marginal spines. The mistake may have arisen from the fact that Gray included in his genus Lamarck's *Trochus fimbriatus* (Animal. s. vert., vol. IX. p. 125.) But Swainson gave his name quite independently for what he considered a new species (Proc. Roy. Soc. Tas., vol. III, p. 39.) Lamarck's definition is *T. testa orbiculato-conica, longitudinaliter obsolete costulata, transversim striata, albido lucescente; anfractibus margine crenulato-fimbriatis, inferne facie planulata, imperforata.* He adds that it was from the seas of New Holland. Its fringes or borders (*franges*) are short, and, as it were, spotted with yellow. Diameter of the base, 13 lines. This description nearly corresponds with Swainson's shell, and who says he had never met with it before. He had doubtless seen Lamarck's types in Paris, because the copy of the work from which I have taken this description is the very one Swainson had with him in Tasmania, now in the museum library, Sydney, and which is full of his manuscript notes on Lamarck's species.* Moreover, Swainson says it was destitute of color or any distinct markings. The shells must be very near each other, and it is a strange coincidence that Swainson gave the same name. His figure is not a very good one, but recognizable. He says:—Shell higher than broad, marked with narrow, uniform longitudinal ribs, crossed by delicate imbricated striæ, suture dilated into a thin, prominent, undulated fringe, plaited into large and regular folds; shell about one and a quarter inches broad, and one inch high, of a uniform fibrous white or bright fawn color, destitute, like the other species of this group, of any bright colors or distinct markings. The transverse striæ on the upper surface are slender, very irregular, or rather undulated, imbricated by lines of growth, which are very near each other; equally irregular are the striæ on the under surface of the body whorl occupied by the fringe, but the centre ones are 5 or 6 in number, regular and concentric; umbilicus concave, but quite closed; the plaitings of the sutural fringe only half as many as the longitudinal ridges.

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*Lamarck's private collection became, at his death, the property of Prince Massena, who sold them to Baron Delessert. They formed part of his celebrated museum, of which M. Chenu, the learned conchologist, was the curator. All the types are labelled in Lamarck's handwriting.

With this genus must be associated *Carinidæ aurea*, Jonas, who places the species in Oken's genus of *Labio.* Messrs. Adams place the same shell in Risso's genus *Bolma.* It cannot be *Labio*, which has a tubercle on the columella, while the general habit is that of our *Trochocochlea.* Neither can it be placed with *Bolma*, whose type is *Trochus rugosus*, Linn,* and whose whorls are rounded, and the inner lip with a thick callosity. The proper position is surely with *C. fimbriata*, where Swainson placed it, and where he figured and described it anew under the name of *C. granulata* (*loc. cit*).

*Astele* is a genus erected by Swainson as remarked in my "CENSUS," and for which A. Adams subsequently proposed the name of *Eutrochus.* It is a conical trochus with a wide perspective umbilicus. Sub-family *Liotianæ.* Operculum

Legrand has re-examined for me, and gives it as his opinion that it is a decided species of *Liotia*.

**CYCLOSTREMA**, Marryat. [*]Messrs. Adams restrict the genus to non-nacreous shells, with an acute entire aperture, otherwise like *Liotia*. The type species is cancellate, though many are smooth.

**ADEORBIS**, Searlcs Wood, 1842 (Mag. Nat. Hist., vol. IX., p. 530). The principal difference between this genus and the last, according to Messrs. Adams, is in the non-discoid trochiform shape, and the non-continuous labrum.

Sub-family, *Umboniinæ*.—Operculum horny, thin, of many whorls, gradually enlarging, outer edge finely ciliated; shell orbicular, depressed porcellanous, the umbilical region often callous.

**UMBONIUM**, Link, 1807 (Beschr. Rost. Samml. 3, p. 136.) Thus Hermanssen, who regards this genus as synonymous with Schumacher's (not Sowerby's) *Globulus*, which has a host of other names, dating back as far as Klein. The shell I described as *Ethalia tasmanica*, should certainly be an *Umbonium*.

Sub-family—*Trochinæ*. Operculum horny, of numerous narrow whorls, nucleus central shell. Conoidal or pyramidal, last whorl more or less angular at periphery, usually flat beneath, aperture transverse, wider than long.

The genus *Trochus*, as restricted by Messrs. Adams, would not include any Tasmanian form. I formerly placed two species in this division, which I shall now for reasons to be stated further on, arrange with *Trochocochlea*.

**CLANCULUS**.—A genus of Montfort (Conch. system, vol. II., p. 190.) synonymous with Fragella, Swainson, Clangulus, Blainville, and Otavia Risso. It is a very good genus, and as restricted by Messrs. Adams, is perfectly recognizable. The shell is solid, turbinate, granular, last whorl rounded, aperture thick and both lips have conspicuous teeth, often many. It is well represented in Tasmania.

**EUCHELUS**.—Philippi. Zeitschr. f. Malak. Feb., 1847, p. 20 (from Gr. εὐ well χηλή a pier, whatever that may signify). These shells are usually umbilicate (the Australian specimens almost obsoletely) the whorls round with deep spiral sulcations and granular keels. The throat is also grooved, there is a tooth on the columella. Operculum ovate, of comparatively few whorls. All the Tasmanian species are well marked.

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[*] Messrs. Adams spell the name Marryatt, and give no reference. On referring to Dr. Hermannsen's Indicis Genera Malacoz, I find the following reference :—"Marryat teste Montague, 1817, Trans. Linn. Soc., XI., p. 194." He adds that he had not verified the reference, but took it from Fleming. He also adds :—"1818, Trans. Linn. Soc., XII sec., Agass." I don't understand the meaning of this last, but the true reference is :—"F. Marryat, descript. of two new shells, *Mitra zonata* and *Cyclostrema cancellata*, Trans. Linn. Soc., vol. XII., p. 338." I presume that Hermannsen took his second reference from Agassiz's, Nomenclator.

Diloma.—Philippi, (Abbild. u. Beschreibungen neuer oder wenig gekannter Conchylien, Cassel vol. 1. Heft., 8 p. 188. Figures and descriptions of new or little known shells). This was only intended as a subgenus by its author, but Messrs. Adams have given it generic value. The distinction is, that the columellar margin does not extend to the outer edge of the labrum, but forms an elevated border or second lip within and parallel to it. But I maintain that this distinction is not of any importance and is shown in many different genera, especially in *Trochocochlea*, *Chlorostoma*, *Chrysostoma*. There is nothing in fact to separate the species from Adams' *Trochocochlea*, and I cannot see even a single feature on which a division would rest. It is said that the common Australian and Tasmanian species, *D. odontis*, Wood, is a smooth shell, but Adams' definition of *Trochocochlea* is made to include smooth forms. Besides, in this *T. odontis* varies. Few can be found without distinct spiral grooves, and there is every gradation to a regular carinate form. *Diloma ingerrima Chemnitz* (the type of the genus?) might easily pass as a small variety of *D. odontis*, and the same may be said of *D. æthiops*. Gmelin.* Both are from New Zealand. I am of opinion that the names should stand *Trochocochlea odontis*, and *T. æthiops*. The opercula of all the ceeded Leach in the British Museum, and published many of his predecessor's genera with due acknowledgment.) Shell nearly always conical, last whorl angular, no umbilicus, columella simple, aperture quadrate. I do not see how these shells can be distinguished from *Thalotia* except by the more elongate form of the latter. The animals of *Thalotia* have not been examined. In *Ziziphinus* the branchial plume is acutely pointed in front, long, tapering like a leaf, and composed of one or more rows of short close-set strands. The male organ is a narrow white, tough, gently arcuate and subulate filament lining or attached from base to point to one side of the branchial leaf. The orifice of the ovary is placed below the rectum. *Radula* central, laminaceous, lanceolate, three parts of the base oval, suddenly wider) tip recurved, sharp, serrulated on both sides; lateral teeth on each side five, imbricated, and shaped like the half of the central one, the last somewhat different in shape, lateral series of teeth, 60 and upwards on each side, the first by far the stoutest, the base dilated behind, the hook toothed below with tubercles, the remaining teeth slender, with a compressed hook pointed; in the inner one, toothed below, serrulated on both sides; in the middle ones, pectinated on each side; in the last, obsolete, scape slender, simple, furnished before the base with an external, spur-shaped; lingual membrane long, linear, transparent (curled?) Gray, *loc. cit.*

**Elenchus**, Humphrey, 1797 (Museum Calonnianum, Specification of the various articles which compose the magnificent museum of natural history collected by M. de Colonne in France. Anonymous, but known to be by Geo. Humphrey, F.L.S.), see Swainson's "Shells and Shell-fish," p. 15. We must accept Swainson as the real author of this genus, as he was the first to define it. It is called Eleuchus and Heleuchus, see Hermannsen, vol. I, p. 416. Swainson says loc. cit., p. 219. These splendid shells, although mostly of a small size, have a brilliancy in the emerald green of their apertures, which is perfectly unrivalled in this family; the basal whorl is convex; the spire is also produced; the base of the pillar in some forms an angle, and in others a small but very distinct tooth. The exterior is always smooth. "This beautiful group," he adds in a note, "was well known to Humphrey, whose name imposed near 40 years ago (Swainson was writing in 1835) we have of course retained instead of some others recently given by the French nomenclators." The group is well defined geographically as well as naturally, for the species are all Australasian, and more common on the south than on the east or west coasts.

**BANKIVIA**, Beck, 1848 (Krauss, Sudafr. Moll.)* The retention of this shell (for there is only one very variable species) in a distinct genus from *Elenchus* is hardly desirable. Messrs. Adams rely on the twisted columella, and the non-nacreous shell; but the shell is nacreous, though only faintly perceptible, and the nacre has a rosy tint.

**TROCHOCOCHLEA**, Klein, 1753 (Tentamen methodi ostracologica 4 B., p. 43). I have given a notice of the genus in the Proc. Linn. Soc., N.S.W., vol. 2, p. 89. I do not think that Klein should have the credit of this genus, as Messrs. Adams' definition in no way agrees with his, which would include nearly all our *Trochidæ*. The following is Klein's definition:—*Trocho-cochlea est cochlea per modum trochi, conice turbinata sed in ultima spira ventricosa, os laterale deducens nec cochlea sine magna inclinatione queat inniti.* Wheel-shell—a shell which is like a wheel, turbinately conical, but in the lower part of the spire ventricose, causing a lateral mouth, so that the shell cannot stand without being greatly inclined. This definition would apply to one-fourth the known univalves, and cannot be said to apply to one more than another of our Australian turbinated genera.† The authors of the "Genera" give a good many synonyms, but only some of them, or perhaps none of them, agree with their definition. Take, for instance, Gray's (not Oken's) *Labio*. In this the axis is perforate. The fact is the name —a very awkward name—is Klein's, and the genus is that of Messrs. Adams. They define it thus:—"Shell solid, conoidal, imperforate in the adult, whorls smooth, or transversely lirate, the last rounded at the periphery aperture nearly to me to come very near to *Astele*, but the form is more turbinate.

**GIBBULA**, Risso, 1826 (Hist. Nat., vol. iv., p. 136.) The species are numerous, and are found, says Messrs. Adams, in every part of the world. The gibbosity of the whorls, the perforated axis, and simple termination of the columella characterise the genus.

**MINOLIA**, A. Adams, 1860 (Annals of Nat. Hist., vol. 6, 3 ser., p. 336, November, 1860.) As this genus is little known I append the definition and remarks. Shell globosely conoidal, widely and deeply umbilicate, whorls rounded latticed, suture channelled, last whorl almost detached, aperture entire, lip thin, acute. *Minolia* is very like *Torinia* in form and sculpture, but the aperture is pearly within. It also resembles in form some southern species of *Margarita*, but the texture marking and sculpture of the shell are different. In sculpture it also resembles the species of *Euchelus*, especially the sub-genus *Perrinia*, which was dredged from deep water in the same locality. The shell was named from the little island of Mino-sima, near Niphon, in the Japanese Archipelago, off which it was obtained. This genus is another modification of the hollow spiral cone of the trochoid family. The whorls are somewhat loosely rolled upon themselves, which causes the sutures to be very deep, and the last whorl to be almost disunited at the peritreme. Half a dozen species are known in Australian waters, but it seems very difficult to separate them from *Cyclostrema*.

Sub-family, *Stomatellinæ*. Foot very thick and fleshy, developed posteriorly; operculum wanting, or thin, horny, ovate, of few rapidly increasing whorls; shell more or less ear-shaped, of few whorls; aperture very wide.

**STOMATELLA**, Lamarck, 1809, Phil. Zool. This genus is distinguished by the possession of an operculum, with an orbicular shell spirally grooved; spire conical; whorls round.

**GENA**, Gray, 1840 (Synop. Brit. Mus.) This is distinguished from the preceding by the oblong elongate form, ear-shaped sub-spiral aperture longer than wide, spire obsolete, surface coloured, and granular. The radula of *Gena* is linear, transparent, rather dilated in front. Teeth, 00.5.1.5.00, in rather an arched series; central narrow elongate, contracted very narrow in upper part; apex small, triangular, reflexed denticulate on the edge; inner lateral teeth 5.5., linear, elongate, placed obliquely; apex small, triangular, reflexed, denticulate on the edge; outer lateral teeth very numerous, hair-like, curved at the end. Gray, loc. cit.

The sub-family of *Stomatellinæ* is very sparingly represented in Australia. Having gone through the whole of the genera of Trochidæ as far as they are known to me in Tasmania, I append a list of how the species enumerated in the census should be arranged.

### Family TROCHIDÆ, Sub-family EUTROPINÆ.

*Phasianella tritonis*, Chem.
*P. sanguinea*, Reeve.
*P. Angasi*, Crosse.
*P. rosea*, Angas.
*P. delicatula*, nobis.

### Sub-family TURBININÆ.

*Turbo undulatus*, Chem.
*T. (Senectus) circularis*, Reeve.
*T. cucculata*, nobis.
*T. straminea*, Martyn.
*Carinidea fimbriata*, Lam. or Sw.
*C. aurea*, Jonas.
*Astele subcarinatus*, Swainson.

### Sub-family LIOTIINÆ.

*Liotia tasmanica*, nobis.

### Sub-family TROCHINÆ.

*Clanculus nodulosus*, A. Adams.
*C. Aloysii*, nobis.
*C. Philomenæ*, nobis.
*C. Dominicanæ*, nobis.
*C. Raphaeli*, nobis.
*C. Angeli*, nobis.
*C. conspersus*, A. Adams.
*C. rubens*, A. Adams.
*C. undatus*, Lam.
*C. Maugeri*, Adams.
*C. variegatus*, A. Adams.
*C. gibbosus*, A. Adams.
*C. nodo-liratus*, A. Adams.
*Euchelus canaliculatus*, Lam.
*E. tasmanicus*, nobis.
*E. scabriusculus*, Ad. and Angas.
*Thalotia conica*, Gray.
*T. picta*, Wood.
*T. Mariæ*, nobis.
*T. dolorosa*, nobis.
*Ziziphinus granulatus*, Born.
*Z. armillatus*, Wood.
*Z. fragum*, Philippi.
*Z. incertus*, Reeve.
*Elenchus badius*, Wood.
*E. bellulus*, Dunker.
*E. irisodontes*, Quoy.
*E. nitidulus*, Phil. Kust.
*Bankivia varians*, Beck.
*Trochocochlea australis*, Favanne.
*T. constricta*, Lam.
*T. tæniata*, Quoy. Query—Var. of above?
*T. odontis*, Wood=Diloma odontis.
*T. compta*, nobis, M.S.
*Stomatella imbricata*, Lam.
*Gena strigosa*, A. Adams.

All the species enumerated in the "Census" and not occurring in the list, I have discarded as varieties, or identical with species already named.

Note.—I beg to correct in this place some of the names of other genera and species contained in the Census.

*Siphonalia castanea*, nobis, is probably a worn and dead form of *Trophon Brazieri*, nobis. *Siphonalia pulchra*, nobis, is an immature state of *Clathurella philomenæ*, nobis.

In describing *Rissoa* (*Setia*) *siennæ*, it should have been added that this shell had been previously described as *Assiminea tasmanica*, nobis.

*Gibbula multicarinata*=*Clanculus nodo-liratus*, Angas, an immature specimen. *Fossarus tasmanicus*, nobis—a young state of *Euchelus tasmanicus*.

*Conus Macleayana*, nobis, is probably a variety of *C. rutila*, differing in color and twice as large as the S. A. specimens.

I have to thank Mr. W. F. Petterd and W. Legrand, for having carefully gone over the whole of the type specimens for me to ascertain the above corrections. In the description of several hundred species there must surely be other alterations and amendments to make, but this, I fear, must be left to other hands.

I should mention also that Mr. Petterd considers that *Auricula Dyeriana*, nobis=*Cassidula zonata*, H. and A. Adams, also that *Murex zonata*, nobis, is only a small and peculiar variety of *Murex* triformis. In these opinions I cannot at present concur.

# NOTES ON BYTHINELLA, ETC.

BY THE REV. J. E. TENISON-WOODS, F.G.S., F.L.S., HON. COR. MEM. R. SOC. TAS., AND PRESIDENT OF THE LINN. SOC. N. S. WALES.

Last year I reviewed in the proceedings of this Society the synonomy of the genus *Bythinella* as far as it is represented by the small freshwater shells of our streams. Since then I have had my attention drawn by Prof. Tate to a species described by Messrs. Quoy and Gaimard, which from the figures and diagnosis I make no doubt belong to the genus, and probably a subsequently described species; have also had an opportunity of seeing Mr. J. Brazier's type specimens of his *Amnicola Petterdiana*, in which I can see no differences to distinguish it from the shell already described. I was not able to examine this type specimen before, as Mr. Brazier had left Sydney, and his collection was packed away. In consequence of this I was obliged to omit any reference to the species in my last paper.

The diagnosis of Messrs. Quoy and Gaimard is as follows: *Paludina nigra*. Q. and G. Voyage de l'Australe, vol. 3, p. 174, plate 58, figs. 9, 12. *P. t. minima, ovato-turrita, nigra; anfractibus quaternis obliquis, convexis, spira obtusa, apertura, subcirculari, prominente.* (Shell minute, ovately turretted, black, whorls four, oblique, convex, spire obtuse, aperture subcircular, prominent). The last whorl equalling all the others. Umbilicus scarcely visible. Black when alive, brownish by dessication. Foot oval, muzzle prominent, cordiform, extended beyond the foot, tentacles long, obtuse, eyes at the base, animal all black except the underside of the foot, which is whitish. Operculum membranaceous. Inhabits the small freshwater streams of D'Entrecasteaux Channel. They add that it cannot be the young of any species, as they found it in such numbers and all of the same size.

I make no doubt that from both the habitat and description, that this is our common *Bythinella*, which has therefore the following synonomy:

BYTHINELLA NIGRA. Quoy and Gaimard, loc. cit. *Paludestrina Wisemaniana*; Brazier, Proc. Zool. Soc. Lond. 1871, p.

698; *Paludestrina Legrandiana*, Brazier, loc. cit. p. 699; *Amnicola Petterdiana*, Braz. Proc. Linn. Soc. N. S. Wales, vol. 1, p. 19; *Bythinia Legrandi*, Tenison-Woods, Proc. Roy. Soc. Tas. 1875, p. 76; *Bythinia unicarinula*, nobis. loc. cit. p. 71; *Bythinella Legrandiana*, nob. op. cit. 1878; *Bythinella nigra*, nob. loc. cit; *Bythinia unicarinata*, Johnston, op. cit. March, 1878; *Bythinella Legrandiana*, Johnston, loc. cit; *Paludestrina Legrandiana*, Johnston, loc. cit.; *Bythinia Tasmania*, Proc. Roy. Soc. Tas. 1865, p. 77; *Bythinella Tasmania*, Johnston, op. cit. March, 1878.

I have also to amend the diagnosis of *Tatea Huonensis*, nobis. Animal with a broadly ovate foot, truncate under the head, *with lateral sinuses;* muzzle reddish brown with colorless lip; tentacles long subulate, colorless, encircled with brown near the tip. Operculum subcalcareous, pauci-spiral, with a vertical submarginal claw.

With regard to the genus *Amnicola*, I have already given my reasons for regarding this as a purely American type. Its history is this: in 1840 Messrs. A. A. Gould and Haldeman in their supplement to a monograph of the Limniades cited the genus in these terms:—Head proboscidiform, shell like *Paludina*, operculum corneous and subspiral. No species was taken as a type. Dr. Gould in his work on the Invertebrata of Massachusetts subsequently defined the genus and took as a type the *Paludinæ* of few whorls. Mr. Stimpson published an essay on Hydrobinæ in 1865, and at p. 13 gave a figure of the operculum of American *Amnicolas*, showing that they possess peculiarities of structure which are found

# THE WILD OR CANADIAN RICE,

## *ZIZANIA AQUATICA.*

By F. Abbott, Jun.

[Read August 12, 1879.]

With reference to this plant, a liberal supply of the seeds of which was received from the Chamber of Agriculture, Washington, United States of America, about a month ago, I would offer the following notes with a view of pointing out the desirability of endeavouring to acclimatise the plant in Tasmania.

The plant is one that would be of great value if introduced in sufficient quantity to become acclimatised in our Lake districts, which are peculiarly suited to its requirements. It not only supplies a great amount of sustenance to water fowl of all kinds, but is a valuable food plant, and affords excellent fodder for cattle. It has also of late years come into repute as an excellent paper making material.

The plant is one that has been known for many years but has not been successfully acclimatised anywhere that I am aware of, and indeed it would not appear that any great efforts have been made for its acclimatisation. It has been from time to time introduced into England, and various botanical gardens in Europe, but does not appear to have escaped from cultivation in such places, and has usually been lost sight of in a few years time.

The late Sir Joseph Banks introduced the plant many years ago, and it reproduced itself in a lake on his estate for several years in succession, but finally was lost sight of during some extensive alterations to the property. Last year it was reported in the *Gardeners' Chronicle* as being under cultivation at the Royal Gardens, Kew, in London, raised from seeds introduced in a damp state, but as yet it has not escaped from house cultures.

There is great difficulty in getting the seeds to germinate when introduced in a dry state, and it is recommended to have them sent in damp clay, when germination is almost a certainty.

The seed just received is to all appearance fresh, and as a considerable portion of it has been sown at the Gardens, and the remainder kept immersed for distribution to any persons having suitable opportunities to give it a fair trial, a short time will suffice to prove whether any of it has retained its germinating power.

The following description of the plant is taken from the columns of the *Gardeners' Chronicle*, more especially the volume for 1874:—

*Zizania aquatica* is common to the North American Continent, in the lakes, swamps, ponds, and shallow streams of which all over the country it produces an incredible amount of herbage.

The pertinacity with which immense flocks of wild fowl haunt the localities where this plant grows naturally, is well known, and whenever the plant gets destroyed from any cause, the game diminishes as a consequence.

The plant grows in vast beds in still waters, having a depth of from 3 to 8 feet, and a deposit of mud or sand, in which the plant luxuriates. Where there is little current, these beds cover a vast area. When the rice begins to show the tender green blades above the water, the lakes seem to be studded with low verdant islands.

The plant usually grows 7 or 8 feet high, but sometimes as much as 10 or 12 feet, the leaves attaining a length of 10 or 12 feet. It has a panicle with female flowers above and male below.

In the month of September in Canada the grains are fully ripe; they are so loosely enclosed between the bearded husks that they fall out at the slightest puff of wind, and the harvest can only be continued for a few days after the maturity of the crop.

The stalk and the branches or ears that have the seed resemble oats both in appearance and manner of growth; the stalk being full of joints and rising from two to four feet above the water, and oftentimes much more.

The squaws collect the seed by paddling through the rice-beds with a stick in one hand and a covered paddle in the other, striking the heads down into the canoe, into which the ripe grain and printing purposes generally. It is quite equal to any prepared from Esparto grass or rags, and has the merit of receiving a very clear impression from the printer. Owing to the freight upon the raw material being charged upon the space occupied and not on the weight, the expense of carriage is so high as to be almost prohibitive. One ton of Zizania straw occupies about 6 tons of space, so that commercially regarded Zizania in a raw state is too bulky for importation with a view to profit.

To get over this difficulty a company was started in Canada (1874) for the purpose of reducing the material to "half-stuff" in which state it can be exported to England at a profit to both the company and the manufacturer. The company has obtained the concession of the whole of the province of Ontario, the only one in which the plant grows to any great extent. One hundred thousand (100,000) tons of the material are assured annually, and it is said, as the plant is a natural production, and the cutting is to be effected by a machine that will improve rather than injure the growth, that there is little chance of there being any diminution in the quantity procurable.

The density of a Zizania grove is so great that the natives frequently fly to it as a place of shelter in times of peril, but sometimes the growth is so thick that the canoes cannot penetrate it.

From the foregoing description it will be seen that the plant is of more than ordinary value as a subject for acclimatisation in Tasmania. It is one that if fairly introduced would continue to perpetuate itself, as being a water plant it would not be liable to be destroyed by browsing animals. From the fact, too, of the harvest being of such short duration, a considerable portion of the seed would naturally fall into the water and escape being destroyed by water fowl, and thus its perpetuation would be assured. But during the first stages of acclimatisation care should be taken to sow the seed in situations not subject to the visitation of water fowl nor liable to the browsing of animals, as in such situations the chances of success would, of course, be greater if both seed and plants remained for some time unmolested.

In a colony like Tasmania, so destitute of natural grain producing plants, the introduction of the Zizania would probably be of great future benefit, for not only would it tend to materially increase the amount of natural game, but would also produce an abundance of wholesome, nutritious food, which would be of great assistance to parties exploring in the interior of the colony; as at certain seasons they would be able to stow the grain for future use.

In missionary and other expeditions in Canada the Zizania frequently forms the principal support of the whole party, and it is spoken of by all who have partaken of it as being not only very nutritious but as being highly agreeable to the taste.

The plant is regarded as being very hardy, being subject to great vicissitudes of climate in its native country, so much so that it is regarded by some as likely to become the natural bread plant of the North.

I have for several years been endeavouring to obtain fertile seeds of this plant. The seed just received is no doubt sent in response to an application made to the Chamber of Agriculture at Washington 2 years ago. In the event of none of the seed now on hand germinating it is my intention to endeavour to obtain a supply direct from Canada, in damp clay, next year, as I consider the plant well worth any expense or exertion that may be necessary for its introduction.

# NOTES ON THE CODLING MOTH.

By Augustus Simson.

[*Read* 12*th* *August*, 1879.]

The Codling Moth (*Carpocapsa pomonella*) is attracting so much attention at present that I hope I may be excused for making some remarks upon the subject.

This insect belongs to that family of the Lepidoptera called Tortricidæ (in French, "Tordeuses"), on account of the general habit of their larvæ of "twisting" or rolling up the leaves of plants of their abode, usually those leaves enclosing a young shoot or bud. They then devour such leaves, shoots or buds, to the great detriment of the plant attacked. A few take up their abode in the interior or fruits, especially the apple, pear, and plum.

Professor Westwood, of Oxford, gave a detailed history of the particular species under notice in one of a series of article on insects most injurious to cultivators in England, in Loudon's *Gardeners' Magazine*, of May, 1838, No. 98. In the same work he gave also, in No. 94, January, 1838, the history of *Ditula angustiorana*, the larva of which does great damage to apricot trees, by tying the young shoots together so firmly that their growth is stopped, and by devouring the young blossom buds. *Tortrix viridana* in certain years strips the oak of its foliage. *Tortrix vitana* does great damage to vines in France.

Dozens of other members of the family might be enumerated, all equally mischievous to certain trees and shrubs; I will, however, only mention one more, *Carpocapsa Woeberiana*, the larvæ of which live beneath the bark of plum trees, where they bore cylindrical galleries and feed upon the sap.

It is highly improbable that this insect was brought to Hobart Town in soma plums sent from the North. Each species, with very few exceptions, confines itself to a particular plant, or at least to plants of the same genus or order.

It would be interesting to ascertain what the species attacking the plum really is. In a catalogue of European Lepidoptera I possess, the species, *Carpocapsa nigricana*, mentioned by Mr. Abbott, is not given. It may be a synonym for the one above alluded to.

The larvæ of all this family are naked fleshy grubs with a horny head, and possess six pectoral (horny and pointed), eight ventral and two anal (fleshy) feet. Mr. Justice Dobson and Mr. F. Abbott, junr., have so fully detailed the proceedings of the insect in all its stages in their valuable papers read at the Society's meeting in May last, that it is unnecessary for me to make any remark on this point, except to observe that the time of appearance is likely to depend very much upon the season.

The emergence of the moths from the chrysalis state, in which they had remained during the winter, will be hastened by warm weather, and, on the contrary, retarded by a cold spring.

It is most probable that there are two generations in the season. The first originates from the chrysalids which have passed the winter in that stage. These attack the earliest fruit and pass through their transformations in a few weeks, the moths produced therefrom laying their eggs on the later fruit. This second generation only gets as far as the chrysalis stage towards the end of the summer, and remains in that state till the ensuing spring.

As to means of destroying these pests, I would recommend in lieu of the paper suggested by Mr. Dobson, that old bagging, strips of blanket, or some such materials be used. I only recently found quite a multitute of similar larvæ, which had spun their cocoons in some woollen material which was lying on some spars of timber with the bark on.

To render any such plan efficient, it would be well to scrape the rough bark off the trees previously to fastening on the material to be used, so as to ensure the caterpillars spinning on or in the substance applied. This should be tied tightly at the upper end, to prevent the grubs from ascending beyond it, but be left tolerably loose and in creases or folds at the lower portion.

For catching the moths, a plan I use for capturing insects might be adopted with advantage. This is to have a wide-mouthed funnel of tinplate, say 12in. to 15in. across the top, with the tube thrown over them; otherwise the pupæ may have had times to become moths, and the trouble will have been in vain.

I will conclude with a few remarks on the report of the select committee recently appointed to enquire into the subject.

1. In reply to the query about removing the bark, I would suggest that this be done to all trees with rough bark as soon as it is known that the grubs have entered the chrysalis stage, the bark thus removed to be burnt. Then I would apply the bagging before mentioned, not later than early next spring, when the blossoms begin to appear. By the removal of the bark the grubs will be compelled to spin in or under the bagging and be all the more surely detected.

2. The grub could undoubtedly travel some distance, but is sure to remain at the first suitable shelter it meets with.

3. I do not think it necessary for the fruit to fall. Most of these larvæ can lower themselves by a silken thread.

4. The grub requires a shelter of such kind as to allow of its forming a cavity therein, in which to spin its cocoon, therefore the traps ordinarily used for earwigs would be of no use whatever.

5. The particular insect reported on attacks only apples and pears.

6. This query is already answered above.

For the following reasons it is impossible that any information resulting from the enquiry in Portugal into the natural history of *Phylloxera vastatrix* can be of any use in regard to the best means of destroying the Codling Moth :—

The Phylloxera belongs to a different order of insects—namely, the Homoptera, family Aphidæ, or Plant-lice, of which the "green fly" on rosetrees is a familiar example. They are suctorial insects, destitute of jaws, living upon the juices of plants, which they absorb through their proboscis or sucker.

Their transformations are quite different from those of the Lepidoptera, they being active and resembling the perfect insect in both the larval and pupa stages.

Their mode of propagation is quite abnormal, and different from that of all other orders of insects. As this is highly interesting and probably not generally known, I quote a short extract on the subject from Professor Westwood's Introduction to the Modern Classification of Insects :—"Each family of plant-lice in spring and summer consists of individuals always wingless, and of pupæ; all these, however, are females, which produce living young without a previous union with the other sex; and Bonnet, whose researches have removed all doubts upon the subject, has clearly shown that this power is exercised at least through nine generations, which are produced within the space of three months. Whilst

Duvau thus obtained eleven generations in seven months, and Kyber even observed that a colony of *Aphis Dianthi*, brought into a constantly heated room, continued to propagate for four years, with a single impregnation of a female by a male, the young being constantly produced of the female sex. The males, of which some are winged, and others apterous in the same society, are not born until the end of the summer or autumn. They fecundate the last generation, produced by the previously born specimens, consisting of wingless females, which then deposit fecundated eggs, which remain through the winter and produce young in the spring capable of reproduction without fresh impregnation."

It is fortunate for owners of orchards that the Carpocapsa has not the same powers of reproduction as the Aphidæ. Westwood quotes from the *Entomological Magazine* that "troops of Aphides were found in the pips of large sound codling apples." Hop-growers are, I suspect, the chief sufferers in the colony from this tribe of insects, and they may probably gain some useful information from the Portugal report when published, though I believe the Aphis Humuli or hop-aphis attacks the leaves and young shoots, whereas the Phylloxera attacks the roots, and therefore the method pursued for the destruction of the latter may not be suitable for the former.

I shall be much obliged by any one kindly sending me some of the pupæ of the Carpocapsa, or of any other similar insects. These I will endeavour to bring to the imago state, and properly mount for the Museum. It will be best to send the small pieces of bark to which they may be attached, or at any rate to send the whole cocoon, which may be placed in a matchbox with some cotton-wool.

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# NOTES ON THE RELATIONS OF THE YELLOW LIMESTONE (TRAVERTIN), OF GEILSTON BAY,

With other

# FLUVIATILE AND LACUSTRINE DEPOSITS IN TASMANIA AND AUSTRALIA,

Together with

# DESCRIPTIONS OF TWO NEW FOSSIL HELICES.

BY ROBT. M. JOHNSON, F.L.S.

[*Read 8th September*, 1879.]

The freshwater limestone in the neighbourhood of Geilston Bay, Hobart Town, is most interesting to geologists on account of the richness of its included organic remains. It attracted the attention of the illustrious Mr. Darwin during the visit of H.M.S. Beagle to Hobart Town, and was afterwards briefly alluded to by him in his "Journal of Researches," p. 448, thus :—

> "A solitary and superficial patch of yellowish limestone, or travertin, which contains numerous impressions of leaves of trees, together with land shells not now existing. It is not improbable that this one small quarry includes the only remaining record of the vegetation of Van Diemen's Land during one former epoch."

Strzelecki also notices it in his "Physical Description of N. S. Wales and V. D. Land," and refers it to Pliocene age. He also gave figures of three fossil plant remains, one of which is the prevailing leaf form in all similar lacustrine deposits. In addition he described and gave figures of two land shells—*H. Tasmanicus*, G. B. Sowerby, *Bulimus Gunnii*, G. B. Sowerby—to which I shall refer hereafter.

Various other writers since that time have contributed to our knowledge of this interesting deposit, chief among whom was the late Mr. Morton Allport, whose contributions and indefatigable labors in the cause of science have made his name so widely known, and his loss so deeply deplored. To him we owe the knowledge that the fossil bones of *Phalangista fuliginosa*, *Hypsiprimni*, etc., are of later date than the travertin with which they were closely associated. Formerly both Mr. Gould and Mr. Allport concluded from the bone remains that the "travertin must be of Recent Tertiary or Post Tertiary age," and consequently that the intrusive basalt must be of still more recent origin.

The discovery of fossil seeds of plants, which have since proved to be closely allied to fruits widely distributed throughout Australia and Tasmania, led Mr. Allport to enquire more particularly into the circumstance connected with the discovery of the fossil bones. This enquiry fully justified his supposition that the bones were obtained from a matrix derived from the originally deposited travertin, and deposited in crevices of the same rock probably formed by the intrusion of the overlying basalt; and he concluded (notice of Roy. Soc. Proc. of Tas., 13th June, 1876), "We must, of course, regard the basalt referred to as an earlier formation than the *diluvium* from which the bones referred to were obtained, but still as of later date than the travertin."

In my second paper on the Launceston Tertiary Basin, read before this Society in the year 1876, I suggested that the travertin beds might belong to the same series as those in the neighbourhood of Launceston, and possibly of the same age as the marine beds at Table Cape and elsewhere in Australia. I made this suggestion because I observed a close resemblance between certain of the undetermined leaf remains common in the respective deposits, and from the circumstance that all the deposits referred to are capped by a more or less decomposed basalt, which, upon analysis, proves to be this feature. The rock referred to is a *feld-spar* basalt, and is easily distinguished from the less valuable *diabase*, or Augite-greenstone, which gives such a peculiar character to the crests of our mountain chains, particularly Ben Lomond and Mount Wellington. The latter rock was formerly supposed to be a Diorite, or Hornblende Greenstone, and Prof. Ulrich, who pointed out this fact, states that " this may explain its non-auriferous character."

Through the praiseworthy labours of R. A. F. Murray, A. W. Howitt, Norman Taylor, Daintree, Brough Smythe, and other Australian geologists, abundant materials for the determination of the Tertiary beds have been gathered together, and, recently, in the hands of leading palæontologists they have yielded important results. From the writings of the gentlemen named I learn that the extensive fluviatile and lacustrine formations in Australia, particularly at Haddon, Bacchus Marsh, Malmsbury, Daylesford, Werribee, Beechworth, Tangil River, Gulgong, Richmond River, Orange River, and in the Darling Downs, Queensland, are the equivalents of similar deposits in Tasmania at Beaconsfield, Nine Mile Springs, Muddy Creek, Tamar, Breadalbane, Avoca, included within my definition of the Launceston Tertiary Basin, and also of the yellow limestone of Geilston Bay, Hobart Town, and the leaf beds of Macquarie Harbour. These freshwater deposits are undoubtedly of vast extent and of great thickness. The relations of the isolated though closely related groups of beds cannot be definitely ascertained, nor, when we take into consideration existing distribution of particular vegetable and animal forms, can we hope to draw sharp inferences in regard to their exact sequence. The preponderance of proteaceous forms in one locality, or of coniferous remains in another, give no clue to chronological sequence. It may only indicate the existence of varied forms of contemporaneous vegetable life under, perhaps, slightly altered circumstances as regards area, soil, or altitude.

No better conception of the restriction of particular forms to certain areas can be had than from a glance at the distribution of existing local well known forms, *e.g.*, in vegetation take *Fagus Cunninghami*, *Frenela australis*, *Anodopet alum biglandu losum*, *Arthrotaxis cupressiformis*, Acacia dralbata, Eucalyptus globulus, Banksia serrata; in land mollusca, take *Helix Launcestonensis*, *H. antialba*, *H. Weldii*, *H. Pictilis*, *H. Bischoffensis*, *H. Lampra*, and *Bulimus Tasmanicus*. I am of opinion, with respect to land and freshwater contemporaneous remains, that we ought to expect greater local difference in separate areas than in more widely separated contemporaneous areas of marine formations.

I am also inclined to think that we have better means of detecting, from fossil remains, the influences which affect contemporaneous distribution in marine mollusca than can be discerned from among corresponding remains in regard to a terrestrial flora.

In reading Lyell's description of the lacustrine formations of the Lower Miocene of France, I was much struck with their characteristics. If the local names be left out, we might apply his account as an excellent general description of the extensive lacustrine formations of Australia or Tasmania. He remarks:—

"Lacustrine strata, belonging for the most part to the same miocene system, as Calcaire de la Beauce, are again met with further south in Auvergne, Cental, and Velay. They appear to be monuments of ancient lakes, which, like some of those now existing in Switzerland, once occupied the depressions in a mountainous region, and have been each fed by one or more rivers and torrents.

"The country where they occur is almost entirely composed of granite and different varieties of granite-schist, with here and there a few patches of secondary strata much dislocated, and which suffered great denudation. There are also some vast piles of volcanic matter, the greater part of which is newer than the freshwater strata, and is sometimes seen to rest upon them, while a small part has evidently been of contemporaneous origin.

"The study of these regions possess a peculiar interest very distinct from that derived from the investigation, either of the Parisian or English tertiary areas, for we are presented in Auvergne with the evidence of a series of events, astonishdescription if taken with special reference to similar formations of vast extent in Victoria and Tasmania. Take, for example, the following description of one single local deposit (the Launceston Tertiary Basin) given by me in a former paper:—

> "The height of the remains of the original strata of this system indicates that the lake must have stretched over a very wide expanse of country in the direction of the existing valleys and plains, and its extent must have been not less than 600 square miles. The denudation which has taken place subsequently has been very great . . . . . It is no exaggeration to say that 15 to 20 miles of strata, one-half to two miles broad, and 400 to 500 feet thick, have been swept away from the immediate vicinity of Launceston alone."

Upon palæontological grounds, as well as upon other important evidences, I am of opinion that the so-called "deep leads" of Beaconsfield (Brandy Creek), referred to in a former paper, are members of the Launceston Tertiary Basin, and upon considerations of a similar character I think there is now little room for doubt but that the auriferous and associated drifts at Haddon, Ballarat, Bacchus Marsh, Tangil River, Daylesford, Werribee, Beechworth, Gulgong, Orange River, Richmond River, Darling Downs, &c., &c., are of the same age. In Tasmania, for similar reasons, I would include the leaf beds of Macquarie Harbour, referred to by Mr. Gould, and the freshwater limestone of Geilston Bay, and vicinity of Trinity Hill, Hobart Town.

The characteristic genera are common to all the beds named, viz., *Laurus*, *Penteune*, *Conchotheca*, *Platycoila*, *Spondylostrobus*.

Remains of *Spondylostrobus Smythii*, F.v.M., foliage fruit, or woody tissue, are found abundant in the various drifts in New South Wales, Victoria, and Tasmania, particularly at Haddon, Orange River, Beaconsfield, and Breadalbane.

*Conchotheca turgida*, F.v.M., has a still wider range, as it is also found on the Darling Downs, Queensland, and Mr. Brough Smythe adds "probably in drift underlying volcanic rocks."

*Platycoila Sullivani*, F.v.M., is the most abundant fruit in the deep leads at Beaconsfield. It is also most plentiful in the Haddon leads, and I think I have traced casts of it in the travertin. Certain seeds figured by Mr. Morton Allport approach it very closely. The genus *Penteune* is common to the beds at Beechworth, Victoria, and the travertin, Hobart Town.

*Penteune Allporti*, F.v.M., of the travertin, approaches very close to *P. Clarkei*, F.v.M., of Beechworth.

*Araucaria Johnstonii*, F.v.M. Cone nearly perfect, associated with abundance of foliage found by me at Geilston quarry during my last visit, together with other fruits of various genera, not yet described by Baron von Mueller, to whom they have been referred.

I have frequently seen impressions of *A. Johnstonii* in the beds of the Launceston Tertiary Basin.

The table of distribution prepared by me will give a more comprehensive view of the links which relate the widely separated deposits.

I think much of the uncertainty spoken of by Victorian geologists arises from association with the older classification. Prior to the determination of vegetable remains the various gold drifts were from very doubtful data assigned relative positions as Oligocene, Miocene, Lower, Middle, and Upper Pliocene, Alluvial and Post Pliocene.

The newer classification merely substitutes other names for those stated, giving the impression that the separate names still represent different geological periods. I do not think that the mere sequence of eruptive rocks should divide periods. I am inclined to think upon palæontological grounds that the majority of the leaf beds are of much older date than is generally supposed. If we must decide between Pliocene and Miocene, I should certainly, with Professor McCoy, incline to the latter period. My confidence in this opinion is increased, when I think of the immense amount of valuable work performed by such men as Rev. J. E. Tenison-Woods, Professor Tate, Professor McCoy, Professor Duncan, Robert Etheridge, jun., Baron von Müeller, and others.

The former gentleman has up to the present time deterforms as our knowledge increases is most significant. According to the principle which has been adopted by Mr. Lyell, and, through him, by nearly all the English geologists, this low percentage of living representatives indicate rather more an eocene than a miocene age for our marine beds of Table Cape. This, too, is in accord with views recently expressed by Mr. Woods.

There is no reason why the same principle, that of percentage of extinct to living species, should not apply to Australia as well as to Europe. The only objection which I have raised against tracing relations with European beds referred more to identification with particular deposits than to periods based upon the degrees of difference between the life of the past and present. The objection to applying the percentage principles in the latter respect is insufficiency of material for purposes of comparison, but I think the force of this objection, in the light of our present knowledge, is not of great weight.

To Baron von Müeller, more than to any other, we owe the knowledge we have of our relations between the present and past of our Australasian Botany. There are now nearly 100 fossil plant remains of the tertiary drifts figured and described, the greater part of which has been carefully determined by the learned Baron from fruits; and, though, for the most part, conclusions based upon plant remains are, as compared with testaceous remains, less satisfactory, yet the acknowledged skill and scrupulous care of our leading phytologist are sufficient warrant for taking the evidence from plant remains as of equal value with the evidence from testaceous remains. With the doubtful exception of remains of two ferns, *Lomaria* and *Trichomanes*, found by me near Launceston, all the plant remains figured or described are of extinct species. This fact, more than any other, speaks of the great antiquity of the formations in which they occur. Although the orders are principally of the same character as the existing ones, yet both the genera and species are for the most part distinct from existing genera and species.

I believe there is yet much undescribed material in local museums and in collectors' hands, but I do not expect that it will, when described and published, do more than confirm conclusions already inferred from existing data. Much may yet be done towards increasing our knowledge of our land and freshwater fauna of tertiary age. Such evidence will be of considerable importance in determining the relations of isolated leaf beds.

In this respect the fossil shells of the Geilston Bay yellow limestone are of great value. Hitherto only two of them have been discovered, viz., *Helix Tasmaniensis*, G. B. Sowerby, and *Bulimus Gunnii*, G. B. Sowerby. By the kindness of Messrs. Legrand and Roblin I have been permitted to examine their respective collections, and have succeeded in determining two new species, viz., *H. Huxleyana*, mihi, and *H. Geilstonensis*, ibid. I have also been able, from various specimens, to identify another shell as a variety of the existing well-known Tasmanian species, *H. Sinclairi*.

This latter form appears to be the only representative of existing species, although there are characteristics of *H. Tasmanensis*, which relate it to that group of existing shells of which *H. Stephensi* may be taken as the type.

To enable other workers to know readily the features of our lacustrine deposits I have prepared a table of the distribution of the flora and fauna of the fluviatile and lacustrine deposits of Australia and Tasmania of tertiary age. The post-tertiary deposits are not included.

I also append descriptions of the following species, viz.:—

*Helix Tasmaniensis*, G. A. Sowerby (amended.)
*Helix Huxleyana*, N.S., mihi.
*Helix Geilstonensis*, N.S., mihi.
*Helix Sinclairi*, var. Cox (still existing.)

A species of Unio, occurring abundantly in the Launceston Tertiary Basin, is now being described by Mr. Robert Etheridge, jun., F.G.S.

As, out of the six shells only one is represented among the living species, the percentage of existing, as compared with extinct forms, is about 17 per cent.

Of course a percentage from such a small number taken

Fossil Yellow Limestone (travertin), Geilston Bay, Hobart Town. This, with the exception of the living species, *H. Launcestonensis*, is the largest known Helix in Tasmania. In certain characteristics, especially in sculpture, it approaches more closely to the group of shells represented by *H. Stephensi* than to any other species now existing in Tasmania.

HELIX HUXLEYANA, N.S.

Shell very minute, sub-discoid, widely umbilicated; whorls 4½, regularly increasing, flatly convex above and below; no trace of sculpture; suture impressed; spire slightly elevated; umbilicus open, shallow, one-third the diameter; aperture lunately oval, margin simple. Greatest dia., 2½ mil.; least, 2¼ mil.; height, 1 mil.

Fossil, Yellow Limestone (travertin), Geilston Bay, Hobart Town. This shell was described from the cast of a solitary specimen, kindly sent to me by Mr. Roblin, from the Museum collection.

HELIX GEILSTONENENSIS, N.S.

Shell orbicularly depressed, narrowly deeply perforate, smooth (?); whorls, 3½ to 3¾, rapidly increasing, flatly convex above, markedly convex below; spire flatly convex; suture impressed; base sharply, suddenly excavate around the deep, narrowly-crateriform umbilicus; aperture large, sub-quadrately lunate; columellar margin, somewhat obliquely produced and reflexed; margins approximating, simple, slightly expanded above and below. Greatest dia., 22 mil.; least, 18 mil.; height, 13 mil.

From Yellow Limestone, Geilston Quarry, near Hobart Town. The species is described from a well-preserved cast. No trace of sculpture could be detected on the specimen examined by me, although it is probable the whorls may have been ornamented by transverse striæ like most of the existing species in Tasmania.

HELIX SINCLAIRI, Var.

Shell depressed, discoid, umbilicate; spire flattened; whorls 4, rapidly increasing, flatly convex above, convex below, ornamented by somewhat coarse regular obliquely-arcuate striæ;* umbilicus narrow, almost perforate, scarcely one-fourth the diameter; aperture obliquely lunate ovate; columellar margin, approximate, slightly reflexed below, scarcely expanded above; lip simple, thin. Greatest dia., 13 mil.; least, 10 mil.; height, 7 mil.; dia. of umbilicus, 3 mil.

Fossil, Yellow Limestone (travertin), Hobart Town. The above species is without doubt identical with the living species, so far as external characters go. Of course such transient features as colour and transparency, which separate the existing shells *H. Sinclairi* and *H. bombycina* are not preserved, but as the existing species named are only recognised by me as varieties of one species, the absence of such features are unimportant.

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*The ornamentation was observed by me in a specimen sent to England. The cast only is preserved in the specimen sent to me by Mr. Legrand.

BULIMUS GUNNII, G. B. Sowerby.

Strzelecki's N.S.W. and V.L., p. 298. Shell oblong-oval, thin, whorls 4 to 5, subventricose, smooth (?); suture conspicuous. A species, says Mr. Morris, which resembles *Bulimus granulosis* in form, differing from that species, however, in being exceedingly thin. As we have only the cast of the inside we cannot further describe it.

Loc. near Yellow Limestone, Hobart Town. From the fragments of the species submitted to me, I should infer that it is closely allied to the existing species, *B. Tasmanicus.* The whorls are striated, irregularly, transversely, as in the existing species, *B. Tasmanicus.*

# LAW OF STORMS.

By the Right Revd. Bishop Bromby, D.D.

[*Read 14th October*, 1879.]

In 1874 I had the honour of reading a paper to this Society upon the Law of Weather and Storms. I then stated that my principal object, in the interests of our merchants and sailors, was to induce others on land, or on ship-board, to register observations, which, when collated with those reported in other countries in the Southern Hemisphere, might lead to some general and useful results. It is now assumed that a circular storm, to use the definition of Buchan, is simply the variation of the atmosphere attempting "to flow in upon a central area of low pressure in an in-moving spiral course." I stated that the rule for determining the *approach* as well as *direction* of the storm had been in somewhat rough and familiar language laid down by Ballot, "If you stand with your back to the wind, the barometer will be lower on your left hand than on your right." This, however, only describes storms in the other hemisphere—the W. India hurricanes, and the typhoons of China, which move from right to left, *i.e.*, in a direction contrary to the movements of the hands of a watch. A man looking eastward in the British Isles, and finding that the barometric pressure at the north of Scotland is, say, ½ inch less than on the south of England, may look out for a westerly gale. In our Tasmanian waters I believe it will generally be found that a storm arises from a conflict between an easterly and westerly wind, the easterly being always found to flow on the polar side of the westerly. It should be borne in mind also that the direction of the force of the wind does not depend upon the height of the barometer, *i.e.*, upon the barometric pressure at the station where the storm occurs, but upon the difference of barometric pressure over a given distance. I stated in my last paper that the force of a wind was regulated by the distance between the station where the storm is felt from the point where at that moment the barometric reading was the lowest, so that if that distance was small the force of the storm would be in the same proportion more violent. This opinion has been questioned among American authorities.

The atmosphere, like the ocean, is one great fluid, and phenomena need to be noted in order to connect effects in one portion of the earth with cases which occur in another. A very little science suffices to qualify the observer, excessive heat leads to excessive evaporation, in consequence of diminished atmospheric pressure, and excessive evaporation leads to storms. We need to note observations all over the world that we may discover how far causes in one country, and even in one hemisphere, affect the climate in another. If, again, there be a periodicity in the weather, and weather storms, is that periodicity raised by the return of the maximum frequency of the sun-spots? Let every society like this continue to register its observations in the service of science and of the mercantile marine.

I have now to do with a short report of one of our own Local Storms. The paper I refer to was read during the time of the visit of the American ship "Swatara." Captain Chandler, a scientific and intelligent observer, heard or read my paper. A few months after his departure from this port he favoured me with a communication of his experience of our waters on his way to New Zealand, which has, therefore, a special interest to ourselves. I will, with this introduction, read his short description of what he believes to have been a true cyclone, confirming my previous impressions of what we might expect of the behaviour of this class of storms in our Southern Hemisphere.

The real causes which produce the cyclones of India and China are but little understood. They are, however, clearly connected with the monsoons.

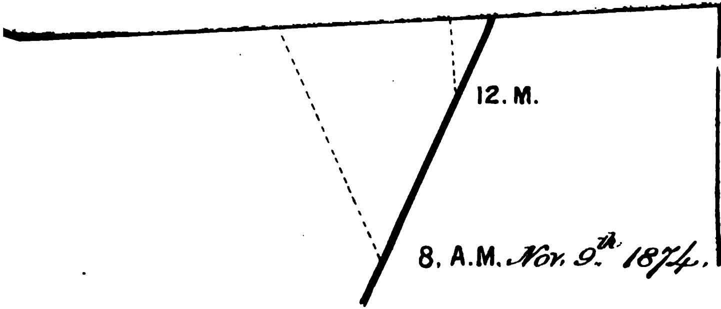
The ablest observers and writers upon physical geography have doubted whether rotatory storms are really ever met with in the South Pacific Ocean. Such a conclusion has of the N.E. trade winds on the northern side of the equator, being sucked in northwards, or even N.W.-wards, towards the heated deserts of Asia. The S.E. trade winds, no longer kept at bay by a belt of a neutral calm, seize the opportunity of crossing the line. Those N.E. trade winds, being already drawn to the heated land, have taken a southerly direction, and the S.E. trades on the S. side of the Equator, and which have now crossed the Equator, and are at the same time losing gradually their easterly character in consequence of the diminished effect of the different diurnal motion of the earth, unchecked by any belt of calm, and meeting with less resistance, are drawn into the general conflict. It has been assumed that (I quote from memory) "there are, on the polar side of the S.E. trade winds, no great plains, except in Australia, upon which the rays of the sun in the summer can play with force enough to rarefy the air sufficiently to materially interrupt these winds in their course," *i.e.*, to make a monsoon of them. This may be true, but the cyclones experienced at the Mauritius are, I imagine, close to the conflict between the trade wind force and the force which impels the air towards the over-heated deserts of Australia. Australia is small, compared with Asia, but if the smallest coral island interferes, as we know it does, with the course of a prevailing wind it would be absurd to doubt the powerful effect which a large continent like Australia, a portion of which lies within the tropical regions, must exercise beyond the usual currents of wind, whether they be the south or the S.E. trade winds, on the polar edges of which the Mauritius stands on (or on a smaller scale), producing a contest between our own steady western trade winds and the indraft produced by the heated continent of Australia in summer.

A great Dutch authority, Jansen, says that "in the South Pacific, and in the South Atlantic, so far as I know, rotatory storms are never known—these seas have no monsoons." I think this statement is not borne out by the short account with which Capt. Chandler has favoured me. We are happily free from those hurricanes with which the E. Indies and the Mauritius are familiar, and which are, in spite of their terribleness, blessings of compensation, and of which we ourselves stand in less need, but I am disposed to think that the same laws in the same economy of nature has produced rotatory storms, which, though unconnected with local monsoons blessing the land, should not be ignored by our shipowners, and the captains of our mercantile marine. As the presence of land, which is the proper home of man, is the chief ultimate cause of storms, we look for far greater calmness in the Southern Hemisphere, from the relative scarcity of land. There is less need for Nature to take violent measures for equalising the temperature and dispersing her water-treasures over thirsty continents, but we look out for storms in the neighbourhood of Cape Horn, and we meet them in our South Australian seas. We may not yet, and may never fully, comprehend the nature of these great forces which restore the equilibrium that has been disturbed, but without the help of the monsoons. I think that this description given us by Capt. Chandler seems to point to a cyclone of diminutive dimensions. It has been laid down as a characteristic of a cyclone that its centre bears about eight points from the direction of the wind on the port side, in the Northern Hemisphere, and on the starboard side in the Southern Hemisphere. Since, however, "the spirally increasing movement of the wind" has been regarded as the true character of a cyclone, it is said that the true position should be 2 or 3 points ahead of the position assumed by the old rule. If we examine the ship's course as indicated in Captain Chandler's drawing, we shall find that the behaviour of the ship was such as to establish the true character of the storm he met with between our homes and New Zealand. It establishes, moreover, my theory that the storms between ourselves and New Zealand come from a conflict between the W. and E. winds, or rather combination, the W. trade wind being drawn in summer to Australia, and the E. or S.E. rushing after it. The subject deserves very careful observation, and it would be well for nautical science if our intelligent captains would register and forward to the Royal Society all the observed phenomena of cyclonic disturbance, noting the rate of movement, and the place and time of their occurrence. The more carefully and frequently such observations are made, at the present time, when the alphabet of weather prophecy is being mastered, the more trustworthy will be the prophecies and the warnings in the future, involving fewer failures, for the guidance and the preservation of our sailors and fishermen.

The science of weather predictions is making, I hope, sure but slow progress. The greatest care should be exercised. *False* prophecies, trusted to, entail great loss of time and money to the fishing fleet; *true* ones, despised, may entail the loss of the fleet itself.

The following is the communication received from Captain Chandler:—

"On the morning of Nov. 9th, 1874, from the appearance of the weather, the action of the barometer, and the change in the wind, I felt fully convinced that the ship was in the south-east quadrant of a light cyclone, and I at once pro-



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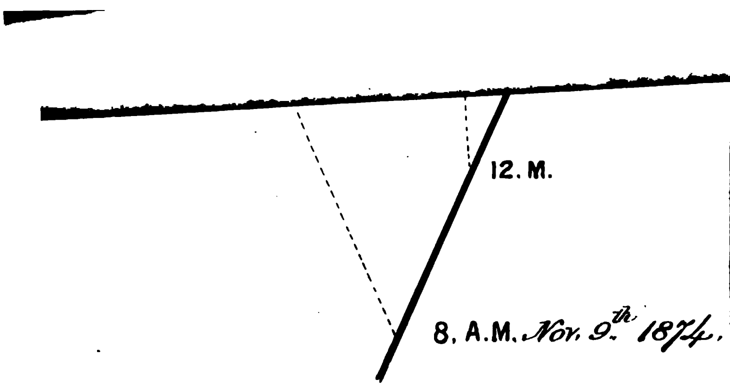
|---|---|---|---|---|
| „ 8 p.m. | 40 | N E by N | 6 x 7<br>6 x 8 | 29·56<br>29·50 |
| „ 12 Mid. | 32 | E N E | 7 | 29·52 |
| Nov. 10, 4 a.m. | 30 | E by S | 4 to 5 | 29·45 |
| „ 8 a.m. | 36 | S E by S | 8 | 29·49 |
| „ 12 m. | 47 | S by E | 7 | 29·58 |
| | 255 | | | |

scarcity of land. There is less need for Nature to take violent measures for equalising the temperature and dispersing her water-treasures over thirsty continents, but we look out for storms in the neighbourhood of Cape Horn, and we meet them in our South Australian seas. We may not yet, and may never fully, comprehend the nature of these great forces which restore the equilibrium that has been disturbed, but without the help of the monsoons. I think that this description given us by Capt. Chandler seems to point to a cyclone of diminutive dimensions. It has been laid down as a characteristic of a cyclone that its centre bears about eight points from the direction of the wind on the port side, in the Northern Hemisphere, and on the starboard side in the Southern Hemisphere. Since, however, "the spirally increasing movement of the wind" has been regarded as the true character of a cyclone, it is said that the true position should be 2 or 3 points ahead of the position assumed by the old rule. If we examine the ship's course as indicated in Captain Chandler's drawing, we shall find that the behaviour of the ship was such as to establish the true character of the storm he met with between our homes and New Zealand. It establishes, moreover, my theory that the storms between ourselves and New Zealand come from a conflict between the W. and E. winds, or rather combination, the W. trade wind being drawn in summer to Australia, and the E. or S.E. rushing after it. The subject deserves very careful observation, and it would be well for nautical science if our intelligent captains would register and forward to the Royal Society all the observed phenomena of cyclonic disturbance, noting the rate of



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|---|---|---|---|---|
| „ 8 p.m. | 40 | N E by N | 6 x 7<br>6 x 8 | 29·56<br>29·50 |
| „ 12 Mid. | 32 | E N E | 7 | 29·52 |
| Nov. 10, 4 a.m. | 30 | E by S | 4 to 5 | 29·45 |
| „ 8 a.m. | 36 | S E by S | 8 | 29·49 |
| „ 12 m. | 47 | S by E | 7 | 29·58 |
| | 255 | | | |

# ON SOME POINTS OF INTEREST CONNECTED WITH THE PLATYPUS.

By Arthur Bingham Crowther, M.R.C.S. Eng., L.R.C.P. Lond.

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(Read 14th October, 1880.)

In bringing before your attention, this evening, the above-named subject, I regret I am able to introduce so little original material connected with these very interesting and anomalous animals. After reading Professor Bennett's work on their peculiarities and habits, also Professor Owen's on their anatomical structure and mode of reproduction, but little ground is left to be worked over, so completely have these two great authors gone into the subject. In relating my own individual experience this evening of these animals, it is more with the hope of leading to a discussion, than adding much fresh material to an already exhausted, but always interesting subject. After careful perusal of Owen's work, the point alone left for elucidation is the actual birth of the fœtus; but when I can tell you that the fœtus has been found in utero, and in a hairless condition in the burrow, our imagination easily fills up the gap. (The former of these startling facts I hope to demonstrate to this Society soon). That the platypus can be kept alive was proved by this must be one of their natural foods; the salt-water fish was skinned, cut into slender pieces, kept very fresh, and free from contact with salt. This they also took and consumed in large quantity for many hours during the day; to a less extent at night. Being nocturnal animals this was strange, but they doubtless were not satisfied with the food provided, hence the necessity of their coming out during the day. For the most part their food is taken under water; they turn over the sand and small stones at the bottom with their powerful bills, and collect in this manner in their cheek pouches whatever they discover, then they rise to the surface, and triturate their food before swallowing it; this trituration is indicated by a slight lateral movement of the jaws. I have also seen them take pieces of fish or worms off stones out of water; after doing so they always return to the water before swallowing it. It may be mentioned these cheek pouches on either side of the jaw are excellently adapted for the primary reception of the food, for organised as the animal is to swallow fluids, it could not well triturate the food at the bottom of rivers, which is done therefore on its reaching the surface of the water. These creatures remain under water a minute or more, which depends upon the supply of food, rising rapidly to the surface if it is plentiful. When on the surface of the water, and food has been abundant, several minutes elapse before the food is triturated and in a condition to swallow. There is a popular idea that their food is always taken with sand, which is necessary for digestion, but with the exception of a little taken whilst procuring their food, this is not true. What is taken for sand is the finely triturated epidermis of beetles, shrimps, etc., which is swallowed, and appears to exert a special and necessary action over digestion and absorption. My not providing these insects doubtless led to the death of my specimens. This material may act as the stones in the gizzards of birds, to still further prepare food for absorption. When swimming the forepaws are widely expanded, being convex forwards, propelling themselves by an antero lateral movement. The hind paws and tail take but little share; the former have a slight lateral horizontal movement, the tail lazily moving with body. When diving the head is rapidly thrown beneath the body, front paws quickly moving until the bottom is arrived at, when they are seen turning rapidly over with their bills the sand, and even large stones, the tail turning from side to side as a rudder, being at an angle of 25 degrees from the river's bed. A train of small bubbles proceeding from the nose marks the exact course the animal is taking. The tail is the first part to reach the surface of the water. I do not know whether this may be due to the fact that fat is more plentiful in this part of the body than elsewhere, and that the greatest buoyancy is situated here. After procuring their food, they remain for some minutes on the water's surface, or emerging from the tank, rest on the side masticating the food procured, seeming at times asleep but for the jaw movements. During this time they will turn on their side and press the water from back and chest with both front and hind paws, also scratch themselves. Their movements on land show that they are but little adapted for long journeys out of water. Their burrows may always be noticed to be just below or on a level with the surface of the river. One curious point here is that the web of front paws is doubled into the palm, the claws projecting, and leaving as they move their mark; with these they burrow, rapidly turning over earth and stones. They soon become very tame in captivity; in a few days the young ones appeared to recognise a call, swimming rapidly to the hand paddling the water; and it is curious to see their attempts to procure a worm enclosed in the hand, which they greedily take when offered to them. I have noticed that they appear to be able to smell whether or not a worm is contained in the closed hand to which they swim, for they desisted from their efforts if an empty fist was offered. Although so tame, they repulse any handling, especially on touching the bill or tail; not so, however, with the side, which they appear to like scratched, turning over, and coming back several times to have the operation repeated. The old ones, however, kept at a distance and refused all overtures. They soon become dry on leaving the water. Their habit is almost immediately to coil up on their side, suppose, by the fighting of the males with one another for possession of the female, a similar action being noticed with other animals. I have seen several of these ulcerations, and have come to the conclusion that it is from the poisoned wound; tracts of skin ulcerating from the virulent nature of the poison. The fact that human beings are so rarely wounded by the platypus' spur, is perhaps to be explained by the comparative clumsiness of movement of the animal when out of water. The last point, seeming to me of the greatest interest, is the rapid appearance and disappearance of the large mammary glands situated on the abdomen to the front of the hind legs. In the females which I have recently examined, not even the rudiment of this gland could be discovered, yet two or three months later it will have attained its full size, as rapidly disappearing after the birth of the embryo. This is, indeed, a wonderful provision of nature. It is obvious how much they would be injured by the animal trailing along the ground. The testicles of the male, situated in the abdomen, is perhaps a similar provision of nature. The Platypus is one of the most interesting creatures in the animal kingdom. I do not think any attention devoted to its observation, or any discussion of its economy, can be thrown away, and this must be my excuse for bringing these few notes, the result of several weeks of great trouble and care, before your Society.

# CENSUS OF THE PLANTS OF TASMANIA, INSTITUTED IN 1879.

By Baron Ferd. von Mueller, C.M.G., M.D., PH.D., F.R.S.

*(Papers and Proceedings, Royal Society of Tasmania,* 1879.*)*

## I.

In the following pages the first part of a statistic essay on Tasmanian plants is submitted to the Royal Society. This portion of the essay is limited to a list of those plants which hitherto have become known from the main island and the smaller isles under its political jurisdiction, as far as Di- and Mono-cotyledoneæ and Ferns are concerned. The arrangement is effected chiefly in accordance with the Candollean system, which in most respects represents that of Jussieu in a reversed series. But the apetalous orders of Jussieu or the Monochlamydeæ of Candolle have been distributed, with the exception of the amentaceous orders, in the other large systematic divisions, and thus several ordinal groups of plants, which by adherence to the usual methods of arrangement would stand far apart, have been brought into close proximity, according to their nearest natural affinities. Since the completion of Dr. Hooker's great work in 1860 about fifty cotyledonar plants, indigenous to the Tasmanian territory, have been discovered; but probably another half-hundred or more could yet be added by future searches, especially if such were further extended to King's Island and the interior north-western regions of the main island, where particularly among the waterplants, rushes, sedges, and minute weeds an extensive additional harvest might probably be gathered. Along with the generic and specific names in the list now prepared, is also quoted the particular publication in which each plant became systematically first established. Hence further details may be traced out from these literary indications regarding also all the plants added since the publication of the Flora Tasmanica. Bentham's important labours for 17 years past on the vegetation of all Australia have been of material aid not only in augmenting the list to its present extent, but also in reducing many specific names to older appellations, to be maintained by the right to priority. To avoid any perplexities which might arise from this needful change of names, whenever Dr. Hooker's fundamental work is to be consulted in connection with this list, it becomes necessary to quote, at the end of each line, the number or numbers under which the species are arranged at pages lvi.-lxxxiii. in the preface to the Flora Tasmanica.

Wide researches into the vegetation of the whole of Australia, to which the writer has devoted much of his time during the last 32 years, have tended to change in many instances the limits assigned originally to the Tasmanian plants, and have shown a degree of variability of many species much higher than could have been anticipated from local studies. Eliminated from the present index are several plants formerly regarded as indigenous, and it is almost certain that some others ought yet to be transferred from the list of indigenous to that of the introduced species. A clear aspect of the original vegetation becomes disturbed by mixing the naturalised with the natural plants; the number of the latter may at last become fixed, but that of the former will increase constantly. An enumeration of such foreign plants as are settled beyond extirpation in the island will form part of the next chapter of this dissertation. A few other plants, accepted in Dr. Hooker's works, have also been excluded here, as their specific validity remained yet obscure. They must find, if necessary, a place in supplemental notes to this compilation. It is also intended to continue this essay in other directions,

## Dicotyledoneæ.

### *Ranunculaceæ.*

| | *Hook. Fl. Tas.* |
|---|---|
| Clematis aristata, R. Br. in Cand. Syst. I., 147 | 1, 2, 3 |
| ——— microphylla, Cand. Syst. I., 147 | 4 |
| Anemone crassifolia, Hook. Icon. t. 247 | 5 |
| Ranunculus aquatilis, L. Sp. Pl., 556 | 6 |
| ——— Gunnianus, Hook. Journ. I., 244, t. 133 | 7 |
| ——— lappaceus, Sm. in Rees' Cyclop. n. 61 | 8, 9, 10, 11, 14 |
| ——— rivularis, B. & S. in G. Forst. Prodr. 90. | 12, 13, 15 |
| ——— parviflorus, L. Sp. Pl. ed. II., p. 780 | 16, 17 |
| Caltha introloba, F. M. in Transact. Phil. Soc. Vict. I., 98 | 18 |

### *Dilleniaceæ.*

| | |
|---|---|
| Hibbertia densiflora, F.M. Pl. of Vict. I., 15 | 26 |
| ——— hirsuta, Benth. Fl. Austr. I., 26 | 29 |
| ——— stricta, R. Br. in Cand. Syst. I., 422 | 28 |
| ——— Billardieri, F.M. Pl. of Vict. I., 14 | 27 |
| ——— acicularis, F.M. Pl. of Vict. I., 17. | 25 |
| ——— serpillifolia, R. Br. in Cand. Syst. I., 430 | 24 |
| ——— angustifolia, Salisb. Parad. Lond., 73 | 21 |
| ——— fasciculata, R. Br. in Cand. Syst. I., 428 | 22 |
| ——— virgata, R. Br. in Cand. Syst. I., 428 | 23 |

### *Magnoliaceæ.*

| | |
|---|---|
| Drimys aromatica, F.M. Pl. of Vict. I., 20 | 19 |

### *Monimieæ.*

| | |
|---|---|
| Atherosperma moschatum, La Bill. Specim. II., 74, t. 224 | 20 |

### *Papaveraceæ.*

Papaver aculeatum, Thunb. Fl. Cap. 431.

### *Cruciferæ.*

| | |
|---|---|
| Nasturtium terrestre, R. Br. in Ait. Hort. Kew. sec. ed. IV., 110 | 36 |
| Barbarea vulgaris, R. Br. in Ait. Hort. Kew, sec. ed. IV., 109 | 35 |
| Cardamine stylosa, Cand Syst. II., 248 | 31 |
| ——— dictyosperma, Hook Journ. I., 246 | 32 |

| | |
|---|---|
| Cardamine radicata, J. Hook. Icon. Pl. t. 882 ........ | 30 |
| ———— hirsuta, L. Sp. Pl., 655.................. | 33, 34 |
| Draba muralis, L. Sp. Pl., 642 ..................... | 41 |
| Stenopetalum lineare, R. Br. in Cand. Syst. II., 513 .. | 37 |
| Capsella elliptica, C. A. Meyer Verz., 194. .......... | 38 |
| ——— antipoda, F.M. Pl. of Vict. I., 44 .......... | 39, 42 |
| Lepidium foliosum, Desv. Journ. III., 164 .......... | 43, 45 |
| ——— ruderale, L. Sp. Pl., 645.................. | 44 |
| Thlaspi Tasmanicum, J. Hook. Fl. Tasm. I., 23 ...... | 40 |
| Cakile maritima, Scop. Flor. Carn. II., 35. | |

*Violaceæ.*

| | |
|---|---|
| Viola betonicifolia, Sm. in Rees' Cyclop. n. 7 ........ | 47 |
| —— Caleyana, G. Don. Dichl. Pl. I., 329 .......... | 49 |
| —— Cunninghami, J. Hook. Fl. New Zeal. I., 16.... | 48 |
| —— hederacea, La Bill. Specim. I., 66, t. 91 ........ | 46 |
| Hymenanthera Banksii, F.M. Pl. of Vict. 1, 69 ...... | 50 |

*Droseraceæ.*

| | |
|---|---|
| Drosera Arcturi, Hook. Journ. of Bot. I., 247........ | 51 |
| ——— pygmæa, Cand. Prod. I., 317 .............. | 52 |
| ——— spathulata, La Bill. Specim. I., 79, t. 106 .... | 53 |
| ——— binata, La Bill. Specim. I., 78, t. 105 ........ | 54 |
| ——— auriculata, Backh. in Ann. Scienc. Nat. Trois. Ser. IX., 95 ................................ | 56 |
| ——— peltata, Smith in Willd. Sp. Pl. I., 1546.. | 57. 58, 59 |

### *Tremandreæ.*

| | |
|---|---|
| Tetratheca ciliata, Lindl. in Mitch. Three Exped. II., 206 | 64 |
| ———— pilosa, La Bill. Specim. I., 95, t. 122.. | 65, 66, 67, 68 |

### *Sterculiaceæ.*

| | |
|---|---|
| Lasiopetalum discolor, Hook. Comp. Bot. Mag. I., 276 | 92 |
| ———— dasyphyllum, Sieb. in Hook. Journ. II., 414 | 93 |
| ———— micranthum, J. Hook. Fl. Tasm. I., 51 .. | 94 |

### *Tiliaceæ.*

| | |
|---|---|
| Aristotelia peduncularis, J. Hook. Fl. Tasm. I., 52 .... | 95 |
| Elæocarpus cyaneus, W. T. Ait. Epit. Hort. Kew. Add. 367. | |

### *Malvaceæ.*

| | |
|---|---|
| Lavatera plebeja, Sims Bot. Mag. t. 2269 ............ | 88 |
| Plagianthus sidoides, Hook. Bot. Mag. t. 3396........ | 91 |
| ———— pulchellus, A. Gray Bot. Wilk. Exped. I., 181 .................................... | 90 |
| ———— spicatus, Benth. in Journ. Linn. Soc. VI., 103 .................................... | 89 |

### *Euphorbiaceæ.*

| | |
|---|---|
| Bertya rosmarinifolia, Planch. in Hook. Lond. Journ. IV., 173 .................................... | 734 |
| Ricinocarpus pinifolius, Desf. in Mem. du Mus. III., 459, t. 22 .................................... | 731 |
| Beyera viscosa, Miq. in Ann. Scienc. Nat. Trois. Ser. I., 350, t. 15 .................................... | 732, 733 |
| Amperea spartioides, Brogn. in Duperr. Voy. 226, t. 49 | 735 |
| Micrantheum hexandrum, J. Hook in Lond. Journ. VI., 283 .................................... | 738 |
| Pseudanthus ovalifolius, F. M. in Trans. Phil. Inst. Vict. II., 66. | |
| Poranthera microphylla, Brogn. in Duperr. Voy. 219, t. 15 .................................... | 739 |
| Phyllanthus australis, J. Hook. in Lond. Journ. VI., 284 | 737 |
| ———— Gunnii, J. Hook. in Lond. Journ. VI., 284 | 736 |
| Euphorbia Drummondi, Boiss. Cent. Euph., 14. | |

### *Urticeæ.*

| | |
|---|---|
| Parietaria debilis, G. Forst. Prodr. 73 .............. | 741 |
| Australina pusilla, Gaud. in Freyc. Voy. 505 ......... | 742 |
| Urtica incisa, Poir. Encycl. Suppl. IV., 223 .......... | 740 |

| | |
|---|---|
| Suæda maritima, Dumort. Fl. Belg., 22 | 681 |
| Salicornia australis, Soland. in G. Forst. Prodr., 88 | 683 |
| ——— arbuscula, R. Br. Prodr., 411 | 682 |

*Ficoideæ.*

| | |
|---|---|
| Mesembrianthemum æquilaterale, Haw. Misc., 77 | 295 |
| ——— australe, Soland. in G. Forst. Prodr., 91. | 296 |
| Tetragonia expansa, Murr. in Comment. Gœtting, 6 | 297 |
| ——— implexicoma, J. Hook. Fl. Tasm. I., 148 | 298 |

*Polygoneæ.*

| | |
|---|---|
| Muehlenbeckia appressa, Meissn. Gen. Pl., 227 | 667 |
| ——— axillaris, J. Hook. in Lond. Journ. VI., 278 | 668 |
| Polygonum strigosum, R. Br. Prodr., 420 | 665 |
| ——— prostratum, R. Br. Prodr., 419 | 666 |
| ——— minus, Huds. Fl. Angl. I., 148 | 663 |
| ——— subsessile, R. Br. Prodr., 419 | 654 |
| ——— lapathifolium, L. Sp. Pl., 360. | |
| Rumex Brownii, Campd. Monogr. Rum., 81 | 661 |
| ——— bidens, R. Br. Prodr., 421 | 662 |

*Leguminosæ.*

| | |
|---|---|
| Sphærolobium vimineum, Sm. in Ann. of Bot. I., 539 | 160 |
| Daviesia latifolia, R. Br. in Ait. Hort. Kew, sec. ed. III., 20 | 158 |
| ——— ulicina, Sm. in Ann. of Bot. I., 506 | 157 |

| | |
|---|---|
| Dillwynia floribunda, Sm. in Ann. of Bot. I., 510 | 162 |
| ———— cinerascens, R. Br. in Bot. Mag., 2247 | 163 |
| Gompholobium Huegelii, Benth. in Hueg. Enum., 29 | 156 |
| Oxylobium ellipticum, R. Br. in Ait. Hort. Kew, sec. ed. III., 10 | 154, 155 |
| Platylobium triangulare, R. Br. in Ait. Hort. Kew, sec. ed. IV., 266 | 187 |
| ———— obtusangulum, Hook. in Bot. Mag., 3258 | 188 |
| ———— formosum, Sm. in Transact. Linn. Soc. II., 350 | 189 |
| Bossiæa cordigera, Benth. in Hook. Fl. Tasm. I., 95 t. 16 | 185 |
| ——— cinerea, R. Br. in Ait. Hort. Kew, sec. ed. IV., 268 | 186 |
| ——— prostrata, R. Br. in Ait. Hort. Kew, sec. ed. IV., 268 | 184 |
| ——— riparia, A. Cunn. in Benth Fl. Austr. II., 166 | 183 |
| Hovea heterophylla, A. Cunn. in J. Hook. Fl. Tasm. I., 93 t. 15 | 182 |
| ——— longifolia, R. Br. in Ait. Hort. Kew, sec. ed. IV., 275 | 181 |
| Goodia latifolia, Salisb. Parad. Londin. t. 41 | 190, 191 |
| Lotus corniculatus, L. Sp. Pl., 775 | 192 |
| —— australis, Andr. Bot. Rep. t. 624 | 193 |
| Psoralea adscendens, F. M. in Trans. Vict. Inst. I., 40 | 194 |
| Indigofera australis, Willd. Spec. Pl. III., 1235 | 195 |
| Swainsonia lessertifolia, Cand. Prodr. II., 271 | 196 |
| Desmodium varians, Endl. in Ann. Wien. Mus. I., 185 | 198 |
| Glycine clandestina, Wendl. Bot. Beobacht, 54 | 200, 201 |
| Caulinia monophylla, F.M. Fragm. VII., 128 | 197 |
| ——— prostrata, F.M. Fragm. VII., 128 | 199 |
| Acacia siculiformis, A. Cunn. in Hook. Lond. Journ. I., 337 | 203 |
| ——— juniperina, Willd. Spec. Pl. IV., 1049 | 205 |
| ——— diffusa, Edw. Bot. Reg., 634 | 204 |
| ——— verticillata, Willd. Spec. Pl. IV., 1049 | 206, 207 |
| ——— Riceana, Hensl. in Maund's Bot. III., t. 135 | 208 |
| ——— axillaris, Benth. in Hook. Lond. Journ. I., 340 | 209 |
| ——— vomeriformis, A. Cunn. in Hook. Lond. Journ. I., 332 | 202 |
| ——— verniciflua, A. Cunn. in Field's N. S. Wales, 344 | 213 |
| ——— stricta, Willd. Spec. Pl. IV., 1052 | 214 |
| ——— penninervis, Sieb. in Cand. Prodr. II., 452. | |
| ——— suaveolens, Willd. Spec. Pl. IV., 1050 | 211 |
| ——— crassiuscula, Wendl. Comment. Acac. 31, t. 8 | 212 |
| ——— myrtifolia, Willd. Sp. Pl. IV., 1054 | 210 |

| | |
|---|---|
| Acacia melanoxylon, R. Br. in Ait. Hort. Kew, sec. ed. V., 462 | 215 |
| ——— longifolia, Willd. Spec. Pl. IV., 1052 | 216, 217, 218 |
| ——— discolor, Willd. Spec. Pl. IV., 1068 | 219 |
| ——— decurrens, Willd. Spec. Pl. IV., 1072 | 220, 221 |

### *Rosaceæ.*

| | |
|---|---|
| Geum urbanum, L. Sp. Pl., 501 | 227 |
| ——— renifolium, F.M. in Transact. Phil. Inst. Vict. II., 66 | 228 |
| Potentilla anserina, L. Sp. Pl. 495 | 224 |
| Rubus Gunnianus, Hook. Icon. Pl. t. 291 | 223 |
| ——— parvifolius, L. Sp. Pl. edit. sec., 707 | 222 |
| Acæna ovina, A. Cunn. in Field's N. S. Wales, 358 | 226 |
| ——— montana, J. Hook. in Lond. Journ. of Bot. VI., 276. | |
| ——— sanguisorbæ, Vahl. Enum. I., 294 | 225 |

### *Saxifrageæ.*

| | |
|---|---|
| Tetracarpæa Tasmanica, J. Hook. in Icon. Pl. 264 | 302 |
| Anodopetalum biglandulosum, A. Cunn. in Endl. Gen., 818 | 299 |
| Anopterus glandulosa, La Bill. Specim. I., 86 t. 112 | 303 |
| Eucryphia Billardierii, Spach Suit a Buff. V., 345 | 98, 99 |
| Bauera rubioides, Andr. Bot. Rep. t. 198 | 300, 301 |

### *Crassulaceæ.*

| | |
|---|---|
| Haloragis micrantha, R. Br. in Flind Voy., 550 | 240 |
| ———— tetragyna, R. Br. in Flind. Voy., 550 | 238 |
| ———— teucrioides, A. Gr. Bot. Wilk. Exped. I., 625 | 237 |
| ———— depressa, Walp. Repert. II., 99 | 239 |
| Gunnera cordifolia, J. Hook. Fl. Tasm. I., 125 | 249 |
| Callitriche verna, L. Sp. Pl. edit sec., 6 | 248 |
| Ceratophyllum demersum, L. Sp. Pl., 992 | 246 |

### *Onagreæ.*

| | |
|---|---|
| Epilobium tetragonum, L. Sp. Pl., 495 | 229–234 |
| Œnothera Tasmanica, J. Hook. Fl. Tasm. I., 119 | 235 |

### *Lythraceæ.*

| | |
|---|---|
| Lythrum salicaria, L. Sp. Pl., 446 | 250 |
| ———— hyssopifolia, L. Sp. Pl., 447 | 251 |

### *Myrtaceæ.*

| | |
|---|---|
| Calycothrix tetragona, La Bill. Specim. II., 8, t. 146 | 252 |
| Thryptomene micrantha, J. Hook. in Kew Misc. V., 299, t. 8 | 253 |
| Bæckea diffusa, Sieb. in Cand. Prodr. III., 230 | 283, 284, 285 |
| ———— Gunniana, Schauer in Walp. Repert. II., 921 | 286 |
| Leptospermum lævigatum, F. M. Report, 1858 | 282 |
| ———— flavescens, Sm. in Transact. Linn. Soc. III., 262 | 278 |
| ———— scoparium, R. and G. Forster Char. Gen., 48 | 276 |
| ———— lanigerum, Sm. in Transact. Linn. Soc. III., 263 | 277, 279 |
| ———— myrtifolium, Sieb. in Cand. Prodr. III., 238 | 280, 281 |
| Kunzea corifolia, Reichenb. Conspect., 178 | 259 |
| Callistemon salignus, Cand. Prodr. III., 223 | 260, 261 |
| Melaleuca gibbosa, La Bill. Specim. II., 30, t. 172 | 258 |
| ———— squarrosa, Sm. in Transact. Linn Soc. VI., 300 | 257 |
| ———— squamea, La Bill. Specim. II., 28, t. 168 | 254 |
| ———— ericifolia, Sm. in Transact. Linn. Soc. III., 276. | 255, 256 |
| Eucalyptus coriacea, A. Cunn. in Walp. Rep. II., 925 | 272 |
| ———— coccifera, J. Hook. in Lond. Journ. VI., 477 | 265 |
| ———— amygdalina, La Bill. Specim. II., 14, t. 154 | 263, 271, 274, 275 |
| ———— cordata, La Bill. Specim. II., 13, t. 152 | 262 |
| ———— obliqua, L'Her. Sert. Angl. 18, t. 20 | 273 |

| | |
|---|---|
| Eucalyptus globulus, La Bill. Voy. I., 153, t. 13 ...... | 264 |
| ———— urnigera, J. Hook in Lond. Journ. VI., 477 | 266 |
| ———— vernicosa, J. Hook. in Lond. Journ. VI., 478 | 270 |
| ———— viminalis, La Bill. Specim. II., 12 t. 151 .. | 267 |
| ———— Stuartiana, F. M. in Ned. Kruidk. Arch. IV., 131 ........................................ | 269 |
| ———— Gunnii, J. Hook. in Lond. Journ. III., 499 | 268 |
| ———— Sieberi, F. M. Atlas, 1879. | |

### *Cucurbitaceæ.*

| | |
|---|---|
| Sicyos angulata, L. Sp. Pl. 1013.................... | 287 |

### *Laurinæ.*

| | |
|---|---|
| Cassytha glabella, R. Br. Prodr., 404 ................ | 686 |
| ———— pubescens, R. Br. Prodr., 404.............. | 685 |
| ———— melantha, R. Br. Prodr., 404 .............. | 684 |

### *Stackhousiaceæ.*

| | |
|---|---|
| Stackhousia pulvinaris, F. M. in Transact. Phil. Soc. Vict., 101. | |
| ———— flava, Hook. Icon. t. 269 ............... | 153 |
| ———— linarifolia, A. Cunn. in Field's N. S. Wales, 356 ........................................ | 150, 151 |
| ———— spathulata, Sieb. in Spreng. Cur. Post., 124 | 152 |

### *Rhamnaceæ.*

### *Santalaceæ.*

| | |
|---|---|
| Leptomeria glomerata, F. M. in Hook. Fl. Tasm. II., 370 | 729 |
| ——— Billardierii, R. Br. Prodr., 354 | 728 |
| Thesium australe, R. Br. Prodr., 212 | 730 |
| Exocarpus humifusa, R. Br. Prodr., 357 | 727 |
| ——— stricta, R. Br. Prodr., 357 | 726 |
| ——— cupressiformis, La Bill. Voy. I., 155, t. 14 | 725 |

### *Proteaceæ.*

| | |
|---|---|
| Isopogon ceratophyllus, R. Br. in Transact. Linn. Soc. X., 72 | 688 |
| Conospermum taxifolium, Sm. in Rees Cycl. IX. | 687 |
| Bellendena montana, R. Br. in Transact. Linn. Soc. X., 166 | 693 |
| Agastachys odorata, R. Br. in Transact. Linn. Soc. X., 158 | 689 |
| Cenarrhenes nitida, La Bill. Specim. I. 36, t. 50 | 690 |
| Persoonia Gunnii, J. Hook. in Lond. Journ. VI., 283 | 692 |
| ——— juniperina, La Bill. Specim. I., 33, t. 45 | 691 |
| Orites diversifolia, R. Br. in Transact. Linn. Soc. X., 190 | 700 |
| ——— Milligani, Meissn. in Cand. Prodr. XIV., 424 | 701 |
| ——— revoluta, R. Br. in Transact. Linn. Soc. X., 190 | 702 |
| ——— acicularis, R. Br. Proteac. Nov., 32 | 703 |
| Grevillea australis, R. Br. in Transact. Linn. Soc. X., 171 | 694 |
| Hakea pugioniformis, Cav. Annal. Hist. Nat. I., 213, t. 11 | 696 |
| ——— epiglottis, La Bill. Specim. L. 30, t. 40 | 695 |
| ——— acicularis, R. Br. in Transact. Linn. Soc. X., 182 | 698, 699 |
| ——— nodosa, R. Br. in Transact. Linn. Soc. X., 179. | |
| ——— microcarpa, R. Br. in Transact Linn. Soc. X., 182 | 697 |
| ——— ulicina, R. Br. Proteac. Nov., 29. | |
| Telopea truncata, R. Br. in Transact. Linn. Soc. X., 198, | 704 |
| Lomatia tinctoria, R. Br. in Transact. Linn. Soc. X., 189 | 706 |
| ——— polymorpha, R. Br. in Transact. Linn. Soc. X., 200 | 705 |
| Banksia marginata, Cav. Annal. Hist. Nat. I. 227, t. 13 | 708 |
| ——— serrata, L. Fil. Suppl., 126 | 707 |

### *Thymeleæ.*

| | |
|---|---|
| Pimelea cinerea, R. Br. Prodr., 361 | 713 |
| ——— Milligani, Meissn. in Cand. Prodr. XIV., 509. | |
| ——— glauca, R. Br. Prodr., 360 | 721 |
| ——— linifolia, Sm. Bot. of N. Holl. 31, t. 11 | 719, 720 |

| | |
|---|---|
| Pimelea ligustrina, La Bill. Specim. I. 9, t. 3 | 717 |
| ——— humilis, R. Br. Prodr., 361 | 722 |
| ——— sericea, R. Br. Prodr., 361 | 715 |
| ——— nivea, La Bill. Spec. I., 10, t. 6 | 714 |
| ——— drupacea, La Bill. Specim. I., 10, t. 7 | 712 |
| ——— filiformis, J. Hook. in Lond. Journ. VI., 280. | 710 |
| ——— axiflora, F. M. in Linnæa, XXVI., 345. | |
| ——— pauciflora, R. Br. Prodr., 360 | 723 |
| ——— pygmæa, F. M. in Linnæa, XXVI., 346 | 724 |
| ——— serpillifolia, R. Br. Prodr., 360. | |
| ——— flava, R. Br. Prodr., 361. | 718 |
| ——— curviflora, R. Br. Prodr., 362 | 711 |
| ——— stricta, Meissn. in Linnæa XXVI., 348. | |
| Drapetes Tasmanica, J. Hook. in Kew Miscell. V., 299, t. 7 | 709 |

## *Umbelliferæ.*

| | |
|---|---|
| Hydrocotyle hirta, R. Br. in Ach. Rich. Hydrocot. 64 | 305, 306, 307, 308 |
| ——— tripartita, R. Br. in Ach. Rich. Hydrocot. 69, t. 61 | 311 |
| ——— pterocarpa, F. M. in Transact. Vict. Inst. 1855, 126 | 309 |
| ——— callicarpa, Bunge in Lehm. Pl. Preiss. I., 283 | 310 |
| ——— Asiatica, L. Sp. Pl. 234 | 304 |

*Araliaceæ.*

| | |
|---|---|
| Panax Gunnii, J. Hook. in Lond. Journ. VI., 466 | 332 |
| —— sambucifolius, Sieb. in Cand. Prodr. III., 255. | |

*Caprifoliaceæ.*

| | |
|---|---|
| Sambucus Gaudichaudiana, Cand. Prodr. IV., 322 | 333 |

*Rubiaceæ.*

| | |
|---|---|
| Coprosma hirtella, La Bill. Specim. I., 70, t. 95 | 334 |
| —— microphylla, A. Cunn. in J. Hook. Fl. Tasm. I., 165 | 335 |
| —— nitida, J. Hook. in Lond. Journ. VI., 465 | 336 |
| —— pumila, J. Hook. in Lond. Journ. VI., 465 | 337 |
| —— repens, J. Hook. Fl. Antarct. I., 23, t. 16A. | |
| —— nertera, F. M. Fragm. IX., 186. | |
| Opercularia ovata, J. Hook. in Lond. Journ. VI., 465 | 338 |
| —— varia, J. Hook. in Lond. Journ. VI., 466 | 339 |
| Asperula conferta, J. Hook. in Lond. Journ. VI., 464 | 341–346 |
| Galium umbrosum, Sol. in G. Forst. Prodr., 89 | 347 |
| —— ciliare, J. Hook. in Lond. Journ. VI., 461 | 348 |
| —— australe, Cand. Prodr. IV., 608 | 349, 350 |
| —— albescens, J. Hook. in Lond. Journ. VI., 462 | 351 |
| —— Aparine, L. Sp. Pl., 108. | |

*Compositæ.*

| | |
|---|---|
| Aster viscosus, La Bill. Specim. II., 53 | 353 |
| —— argophyllus, La Bill. Specim. II., 52, t. 201 | 352 |
| —— myrsinoides, La Bill. Specim. II., 53, t. 202 | 354, 355 |
| —— persoonoides, A. Cunn. in Cand. Prodr. V., 267 | 356, 357 |
| —— obcordatus, F. M. Fragm. V., 69 | 358 |
| —— pinifolius, F. M. Fragm. V., 71 | 362 |
| —— ledifolius, A. Cunn. in Cand. Prodr. V., 269 | 363 |
| —— stellulatus, La Bill. Spec. II., 50, t. 196 | 359, 360, 361 |
| —— axillaris, F. M. Fragm. V., 64 | 364 |
| —— ramulosus, La Bill. Specim. II., 51, t. 198 | 365 |
| —— florulentus, F. M. Fragm. V., 82 | 367 |
| —— lepidophyllus, Pers. Syn. II., 442 | 366 |
| —— glutescens, F. M., Fragm. V., 77 | 369 |
| —— Hookeri, F. M. | 370 |
| —— glandulosus, La Bill. Specim. II., 50, t. 197 | 368 |

| | |
|---|---|
| Aster Huegelii, F. M. Fragm. V., 79 | 371 |
| —— Celmisia, F. M. Fragm. V., 84 | 372 |
| Vittadinia australis, A. Rich. Voy. Astrol., 250 | 373, 374 |
| Erigeron pappochromus, La Bill. Specim. II., 47, t. 193 | 375, 376, 377 |
| Lagenophora Billardierii, Cass. in Dict. XXV., 111 | 384, 391, 392, 393 |
| —— Huegelii, Benth. in Hueg. Enum., 59 | 394 |
| —— emphysopus, J. Hook. Fl. Tasm. I., 189 | 395 |
| Brachycome diversifolia, F. & M. Ind. Sem. Hort. Petr. II., 31 | 388 |
| —— radicans, Steetz in Lehm. Pl. Preiss. I., 420 | 380 |
| —— graminea, F. M. Fragm. I., 49 | 383 |
| —— angustifolia, A. Cunn. in Cand. Prodr. V., 306 | 385 |
| —— decipiens, J. Hook. in Lond. Journ. VI., 114 | 378 |
| —— cardiocarpa, F. M. in Benth. Fl. Austr. III., 517 | 381 |
| —— scapiformis, Cand. Prodr. V., 306 | 379, 382 |
| —— stricta, Cand. Prodr. V., 305 | 386, 387 |
| —— ciliaris, Less. Synops. Compos., 172 | 389 |
| Nablonium calyceroides, Cass. in Dict. XXXIV., 101 | 396 |
| Cotula filifolia, Thunb. Fl. Cap. 696. | |
| —— coronopifolia, L. Sp. Pl., 892 | 397, 399 |
| —— australis, J. Hook. Fl. Nov. Zel. I., 128 | 398 |
| —— alpina, J. Hook. Fl. Tasm. I., 192, t. 51A | 400 |

| | |
|---|---|
| Millotia tenuifolia, Cass. in Ann. Scienc. Nat. 1829, p. 31 | 438 |
| Ixiolæna supina, F. M. in Transact. Vict. Inst. 1855, 37. | |
| Podolepis acuminata, R. Br. in Ait. Hort. Kew, sec. ed. V., 82 | 437 |
| Leptorrhynchus squamatus, Less. Synops. Comp., 273 | 435 |
| ———— elongatus, Cand. Prodr. VI., 160 | 436 |
| ———— linearis, Less. Synops. Comp., 273. | |
| Helichrysum scorpioides, La Bill. Specim. II., 45, t. 191 | 440 |
| ———— dealbatum, La Bill. Specim. II., 45, t. 190 | 445 |
| ———— Spiceri, F. M. Fragm. XI., 47. | |
| ———— pumilum, J. Hook. Fl. Tasm. I., 213, t. 60 | 446 |
| ———— Milligani, J. Hook. Fl. Tasm. I., 214, t. 60 | 447 |
| ———— lucidum, Henckel Adumbr., 1806 | 443, 447 |
| ———— leucopsidium, Cand. Prodr. VI., 193 | 444 |
| ———— apiculatum, Cand. Prodr. VI., 195 | 442 |
| ———— semipapposum, Cand. Prodr. VI., 105 | 441 |
| ———— reticulatum, Less. in Steud. Nomencl. edit. II. | 422 |
| ———— cinereum, F. M. in Benth. Fl. Aust. III., 629 | 423 |
| ———— bracteolatum, Benth. Fl. Austr. III., 630 | 424 |
| ———— Gunnii, F. M. in Benth. Fl. Austr. III., 630 | 430 |
| ———— ledifolium, Benth. Fl. Austr. III., 631 | 427 |
| ———— rosmarinifolium, Less. in Steud. Nomencl. edit. II. | 428, 429, 431 |
| ———— ferrugineum, Less. in Steud. Nomencl. edit. II. | 432 |
| ———— antennarium, F. M. in Benth. Fl. Austr. III., 632 | 425 |
| ———— obcordatum, F. M. in Benth. Fl. Austr. III., 632 | 421 |
| ———— Backhousii, F. M. in Benth. Fl. Austr. III., 632 | 426 |
| ———— Gravesii, F. M. | |
| ———— baccharoides, F. M. Fragm. V., 200 | 417 |
| ———— scutellifolium, Benth. Fl. Austr. III., 633 | 420 |
| ———— lycopodioides, Benth. Fl. Austr. III., 634 | 418 |
| ———— selaginoides, F. M. in Benth. Fl. Austr. III., 634 | 419 |
| Helipterum anthemoides, Cand. Prodr. VI., 216 | 449 |
| ———— incanum, Candr. Prodr. VI., 215 | 448 |
| Antennaria Planchoni, F. M. | 455 |
| ———— nubigena, F. M. in Transact. Phil. Soc. Vict. I., 45 | 433 |
| ———— Meredithæ, F. M. in Papers Roy. Soc. Tasm, 1870, p. 15, | |

| | |
|---|---|
| Gnaphalium luteo-album, L. Sp. Pl., 851 | 450 |
| ———— Japonicum, Thunb. Fl. Jap., 311 | 451, 452 |
| ———— alpigenum, F. M. in Hook. Fl. Tasm. I., 217, t. 62A | 453 |
| ———— indutum, J. Hook. in Lond. Journ. VI., 121 | 454 |
| Pterygopappus Lawrencei, J. Hook. in Lond. Journ. VI., 120 | 434 |
| Erechtites prenanthoides, Cand. Prodr. VI., 296 | 456 |
| ——— arguta, Cand. Prodr. VI., 296 | 457 |
| ——— quadridentata, Cand. Prodr. VI., 295 | 458, 460 |
| ——— hispida, Cand. Prodr. VI., 296 | 459 |
| Senecio papillosus, F. M. in Transact. Vict. Inst. II., 69 | 471 |
| ——— primulifolius, F. M. in Transact. Vict. Inst. II., 69 | 470 |
| ——— pectinatus, Cand. Prodr. VI., 372 | 463, 464 |
| ——— spatulatus, Ach. Rich. Sert. Astrolab., 125 | 465 |
| ——— centropappus, F. M. Gen. Rep. 1858, 26 | 474 |
| ——— lautus, G. Forster Prodr., 91 | 461, 462 |
| ——— velleyoides, A. Cunn. in Cand. Prodr. VI., 374 | 466 |
| ——— australis, Willd. Spec. Pl. III., 1981 | 467 |
| ——— odoratus, Horn. Hort. Hafn. II., 809 | 468 |
| ——— Bedfordi, F. M. Gen. Rep. 1858, 26 | 472 |
| ——— Billardieri, F. M. Gen. Rep. 1858, 26 | 473 |
| Cymbonotus Lawsonianus, Gaud. Bot. Voy. Freycin., 462, t. 86 | 475 |
| Microseris Forsteri, J. Hook. Fl. Nov. Zel. I., 151 | 476 |

### *Stylideæ.*

| | |
|---|---|
| Lobelia pedunculata, R. Br. Prodr., 563 | 496 |
| Isotomia fluviatilis, F. M. in Benth. Fl. Austr. IV., 136 | 497 |
| Wahlenbergia gracilis, A. de Cand. Monog. Campan., 142 | 500 |
| ——— saxicola, A. de Cand. Monog. Campan., 144 | 501 |

*Goodenoviaceæ.*

| | |
|---|---|
| Brunonia australis, Sm. in Transact. Linn. Soc. X. 367, t. 28 | 479 |
| Dampiera stricta, R. Br. Prodr., 589 | 480 |
| Scævola Hookeri, F. M. Rep. 1853, p. 15 | 481 |
| ——— æmula, R. Br. Prodr., 584. | |
| ——— microcarpa, Cav. Icon. VI., 509. | |
| Selliera radicans, Cav. Icon. V., 49, t. 474 | 482 |
| Goodenia humilis, R. Br. Prodr., 575 | 483 |
| ——— elongata, La Bill. Specim. I., 52, t. 75 | 485 |
| ——— geniculata, R. Br. Prodr., 577 | 486 |
| ——— ovata, Sm. in Transact. Linn. Soc. II., 347 | 487 |
| ——— barbata, R. Br. Prodr., 576. | |
| Velleya paradoxa, R. Br. Prodr., 580 | 488 |
| ——— montana, J. Hook. in Lond. Journ. VI., 265 | 489 |

*Gentianeæ.*

| | |
|---|---|
| Limnanthemum exaltatum, F. M. Fragm. IX., 165 | 585 |
| ——— exiguum, F. M. Fragm. IX., 164 | 586 |
| ——— Gunnii, F. M., Fragm. IX., 164 | 587 |
| Gentiana saxosa, G. Forst. in Svensk Akad. Handl. 1777, p. 183, t. 5 | 583, 584 |
| Sebæa ovata, R. Br. Prodr., 452 | 580 |
| ——— albidiflora, F. M. in Transact. Phil. Soc. Vict. I., 46 | 581 |
| Erythræa australis, R. Br. Prodr., 451 | 582 |

*Loganiaceæ.*

| | |
|---|---|
| Mitrasacme pilosa, La Bill. Specim. I., 36, t. 49 | 591 |
| ——— serpillifolia, R. Br. Prodr., 454 | 590 |
| ——— montana, J. Hook. Fl. Tasm. I., 274, t. 88. | 592 |
| ——— Archeri, J. Hook. Fl. Tasm. II., 368 | 593 |
| ——— paradoxa, R. Br. Prodr., 454 | 588 |
| ——— distylis, F. M. in Transact. Phil. Soc. Vict. I., 20 | 589 |

*Plantagineæ.*

| | |
|---|---|
| Plantago varia, R. Br. Prodr., 424 | 653, 654, 655 |
| ——— Tasmanica, J. Hook. in Lond. Journ. VI., 276 | 656, 657 |

| | |
|---|---|
| Plantago Brownii, Rapin in Mem. Soc. Linn. Par. VI., 484 | 658, 659 |
| ———— Gunnii, J. Hook. in Lond. Journ. V., 466, t. 13 | 660 |

### *Oleaceæ.*

| | |
|---|---|
| Notelæa ligustrina, Vent. Choix, 35 | 577 |

### *Apocyneæ.*

| | |
|---|---|
| Lyonsia straminea, R. Br. Prodr., 466 | 579 |
| Alyxia buxifolia, R. Br. Prodr., 470 | 578 |

### *Epacrideæ.*

| | |
|---|---|
| Styphelia adscendens, R. Br. Prodr., 537 | 506 |
| ———— humifusa, Pers. Synops. I., 174 | 507 |
| ———— pinifolia, Spr. Syst. I., 659 | 508 |
| ———— Billardierii, F. M. Fragm. VI., 43 | 509 |
| ———— straminea, Spr. Syst. I., 656 | 510, 511 |
| ———— Hookeri, F. M. Fragm. VI., 44 | 513 |
| ———— dealbata, Spr. Syst. I., 659 | 512 |
| ———— abietina, La Bill. Specim. I., 48, t. 68 | 517 |
| ———— oxycedrus, La Bill. Specim. I., 49 | 514, 516 |
| ———— parvifolia, R. Br. Prodr., 540 | 515 |
| ———— strigosa, Sm. Bot. New Holl. | 518 |
| ———— montana, R. Br. Prodr., 540 | 519, 529 |
| ———— lanceolata, Sm. Bot. New Holl., 49 | 523 |
| ———— Richei, La Bill. Specim. I., 44, t. 60 | 522 |
| ———— australis, R. Br. Prodr., 541 | 524 |
| ———— virgata, La Bill. Specim. I., 46, t. 65 | 525 |
| ———— collina, La Bill. Specim. I., 47, t. 65 | 527, 528 |

| | |
|---|---|
| Epacris impressa, La Bill. Specim. I., 43, t. 58 | 544, 545, 546 |
| ——— petrophila, J. Hook. Fl. Tasm. I., 261 | 558 |
| ——— obtusifolia, Sm. Exot. Bot. I., 77, t. 40 | 555 |
| ——— myrtifolia, La Bill. Specim. I., 41, t. 55 | 551, 557 |
| ——— exserta, R. Br. Prodr., 551 | 553, 554 |
| ——— mucronulata, R. Br. Prodr. Specim., 552 | 556 |
| ——— lanuginosa, La Bill. Specim. I., 42, t. 57 | 547 |
| ——— heteronema, La Bill. Specim. I., 42, t. 56 | 549 |
| ——— serpillifolia, R. Br. Prodr., 551 | 550, 552 |
| ——— microphylla, R. Br. Prodr., 550 | 543 |
| ——— acuminata, Benth. Fl. Austr. IV., 240 | 548 |
| ——— hirtella, F. M. Fragm. VI., 71 | 560, 561 |
| ——— micranthera, F. M. Fragm. VI., 72 | 562, 563 |
| Prionotes cerinthoides, R. Br. Prodr., 553 | 559 |
| Poiretia cucullata, Cav. Icon., t. 343 | 564, 565, 566 |
| Richea sprengeloides, F. M. Fragm. VI., 68 | 567 |
| ——— procera, F. M. Fragm. VI., 68 | 568 |
| ——— acerosa, F. M. Fragm. VI., 69 | 569 |
| ——— Milligani, F. M. Fragm. VI., 69 | 570 |
| ——— Gunnii, J. Hook. in Lond. Journ. VI., 273 | 573 |
| ——— scoparia, J. Hook. Fl. in Lond. Journ. VI., 273 | 574 |
| ——— dracophylla, R. Br. Prodr., 555 | 572 |
| ——— pandanifolia, J. Hook. Fl. Antart. I., 50 | 571 |
| Dracophyllum Milligani, Hook. Icon. Pl. 845 | 575 |
| ————— minimum, F. M. Fragm. I., 39 | 576 |

### *Ericineæ.*

| | |
|---|---|
| Pernettya Tasmanica, J. Hook. in Lond. Journ. VI., 268 | 505 |
| Gaultihera hispida, R. Br. Prodr., 559 | 502 |
| ———— lanceolata, J. Hook. in Lond. Journ. VI., 267 | 503 |
| ———— antipoda, G. Forst. Prodr., 196 | 504 |

### *Convolvulaceæ.*

| | |
|---|---|
| Convolvulus erubescens, Sims Bot. Mag., t. 1067 | 594 |
| ———— sepium, L. Sp. Pl., 153 | 595, 596 |
| Dichondra repens, Forst. Gen. 39, t. 20 | 599 |
| Wilsonia humilis, R. Br. Prodr., 490 | 597 |
| ——— Backhousii, J. Hook. in Lond. Journ. VI., 275 | 598 |
| Cuscuta Tasmanica, Engelm. in Transact. Acad. St. Louis I., 512 | 600 |

### *Solanaceæ.*

| | |
|---|---|
| Solanum aviculare, G. Forst. Prodr., 18 | 622 |
| ——— vescum, F. M. in Transact. Vict. Inst. 1855, p. 59. | |
| Anthocercis Tasmanica, J. Hook. Fl. Tasm. I. 289, t. 92 | 623 |

### *Scrophularinæ.*

| | |
|---|---|
| Mazus Pumilio, R. Br. Prodr., 439 ................ | 625 |
| Mimulus repens, R. Br. Prodr., 439 ................ | 624 |
| Gratiola Peruviana, L. Sp. Pl., 17 ............... | 626, 627 |
| ——— nana, Benth. in Cand. Prodr. X., 404........ | 628 |
| Glossogyne elatinoides, Benth. in J. Hook. Fl. Nov. Zel. I., 189 ........................................ | 629 |
| Limosella aquatica, L. Sp. Pl., 631.................. | 630 |
| Veronica formosa, R. Br. Prodr., 434................ | 631 |
| ——— Derwentia, Littlejohn in Andr. Bot. Rep. t. 531 | 632 |
| ——— nivea, Lindl. Bot. Reg. 1842, Misc., 42...... | 633 |
| ——— gracilis, R. Br. Prodr., 435 ................ | 637 |
| ——— distans, R. Br. Prodr., 435 ............ .... | 635 |
| ——— calycina, R. Br. Prodr., 435................ | 634 |
| ——— plebeja, R. Br. Prodr., 435. | |
| ——— notabilis, F. M. in Benth. Fl. Austr. IV., 511. | |
| Ourisia integrifolia, R. Br. Prodr., 439 .............. | 638 |
| Euphrasia scabra, R. Br. Prodr., 437................ | 642 |
| ———— Brownii, F. M. Fragm. V., 88.. | 639, 640, 641, 643 |
| ———— cuspidata, J. Hook. Fl. Tasm. I., 298 ...... | 644 |

### *Lentibularinæ.*

| | |
|---|---|
| Utricularia flexuosa, Vahl. Enum. I., 198 ............ | 645 |
| ———— dichotoma, La Bill. Specim. I., 11, t. 8.. | 646, 647 |
| ———— lateriflora, R. Br. Prod., 431.............. | 648 |
| ———— monantha, J. Hook. Fl. Tasm. I., 299 ..... | 649 |
| Polypompholyx tenella, Lehm. Nov. Stirp. Pug. VIII., | |

| | |
|---|---|
| Prostanthera rotundifolia, R. Br. Prodr., 509 | 613 |
| ———— cuneata, Benth. in Cand. Prodr. XII., 560 | 614 |
| Westringia angustifolia, R. Br. Prodr., 501 | 617 |
| ———— rosmariniformis, Sm. Tracts, 227, t. 3. | |
| ———— brevifolia, Benth. Labiat., 459 | 616 |
| ———— rubiifolia, R. Br. Prodr., 501 | 615 |
| Teucrium corymbosum, R. Br. Prodr., 504 | 618 |
| Ajuga australis, R. Br. Prodr., 503 | 619 |

### *Myoporinæ.*

| | |
|---|---|
| Myoporum insulare, R. Br. Prodr., 516 | 620 |
| ———— parvifolium, R. Br. Prodr., 516. | |

### *Primulaceæ.*

| | |
|---|---|
| Samolus repens, Pers. Synops. I., 171 | 651 |

### *Cupuliferæ.*

| | |
|---|---|
| Fagus Gunnii, J. Hook. in Icon. Pl., 881 | 744 |
| ——— Cunninghami, Hook. Journ. of Bot. II., 152, t. 7 | 743 |

### *Casuarineæ.*

| | |
|---|---|
| Casuarina quadrivalvis, La Bill. Specim. II., 67, t. 218. | 745 |
| ———— suberosa, Otto and Dietr. Gartenzeit, 1841, 155 | 747 |
| ———— distyla, Vent. Jard. Cels. t. 62 | 746 |
| ———— bicuspidata, Benth. Fl. Austr. VI., 202. | |

### *Coniferæ.*

| | |
|---|---|
| Athrotaxis cupressoides, D. Don. in Transact. Linn. Soc. XVIII., 173, t. 13, f. 2 | 751 |
| ———— laxifolia, Hook. Icon., 573 | 753 |
| ———— selaginoides, D. Don. in Transact. Linn. Soc. XVIII., 172, t. 14 | 752 |
| Prenela Ventenatii, Mirb. in Mém. du Mus. XIII., 74. | 748 |
| ——— australis, R. Br. in Mém. du Mus. XIII., 74 | 749 |
| Diselma Archeri, J. Hook. Fl. Tasm. I., 353, t. 98 | 750 |
| Pherosphæra Hookeriana, Arch. in Kew Misc. II., 52. | 754 |
| Dacrydium tetragonum, Parl. in Cand. Prodr. XVI., II., 496 | 757 |
| ———— Franklini, J. Hook. in Lond. Journ. IV., 152, t. 6 | 756 |
| Nageia alpina, F. M. Bot. Teach., 38 | 755 |
| Phyllocladus rhomboidalis, A. Rich. Conif., 130, t. 3 | 758 |

## **Monocotyledoneæ.**

### *Hydrocharideæ.*

| | |
|---|---|
| Vallisneria spiralis, L. Sp. Pl., 1015 | 87 |

### *Orchideæ.*

| | |
|---|---|
| Dendrobium striolatum, G. Reichenb. in Otto's Gartenzeit, 1857, 313 | 77, 78 |
| Sarcochilus parviflorus, Lindl. in Bot. Reg. 1838. App. 34 | 76 |
| Dipodium punctatum, R. Br. Prodr., 331 | 75 |
| Gastrodia sesamoides, R. Br. Prodr., 330 | 74 |
| Spiranthes australis, Lindl. Orch. Pl., 464 | 28 |
| Calochilus campestris, R. Br. Prodr., 320 | 27 |
| Thelymitra ixioides, Sw. in Kongel. Akad. Stockh. Handl. 1800, 228, t. 3 L. | 7 |
| ———— aristata, Lindl. Orchid. Pl., 521 | 6 |
| ———— longifolia, R. and G. Forst. Char. Gen., 98, t. 49 | 5 |
| ———— carnea, R. Br. Prodr., 314 | 4 |
| ———— flexuosa, Endl. Nov. Stirp. Dec., 23 | 2 |
| ———— antennifera, J. Hook. Fl. Tasm. II., 4, t. 101 A | 1 |
| ———— cyanea, Lindl. in Benth. Fl. Austr. VI., 323 | 3 |
| Diuris palustris, Lindl. Orch. Pl., 507 | 9 |
| —— maculata, Sm. Exot. Bot. I., 57, t. 38 | 8 |
| —— pedunculata, R. Br. Prodr., 316 | 12 |
| —— sulphurea, R. Br. Prodr., 316 | 10 |
| —— longifolia, R. Br. Prodr., 316 | 11 |

| | |
|---|---|
| Corysanthes pruinosa, A. Cunn. in N. S. Wales Mag. I. | 29 |
| Pterostylis curta, R. Br. Prodr., 326 | 34 |
| ——— nutans, R. Br. Prodr., 327 | 35 |
| ——— pedunculata, R. Br. Prodr., 327 | 36 |
| ——— nana, R. Br. Prodr., 327 | 37 |
| ——— semirubra, F. M. Fragm. VIII., 247 | 37 |
| ——— cucullata, R. Br. Prodr., 327 | 39 |
| ——— furcata, Lindl. Orch. Pl., 390 | 40, 41 |
| ——— præcox, Lindl. Orch. Pl., 388 | 45 |
| ——— obtusa, R. Br. Prodr., 327 | 38 |
| ——— parviflora, R. Br. Prodr., 327 | 47 |
| ——— aphylla, Lindl. Orch. Pl., 392 | 46 |
| ——— barbata, Lindl. in Bot. Reg. XXV., App. 53 | 42 |
| ——— mutica, R. Br. Prodr., 328 | 43 |
| ——— rufa, R. Br. Prodr., 327 | 44 |
| ——— longifolia, R. Br. Prodr., 327 | 48 |
| Caleana major, R. Br. Prodr., 329 | 32 |
| ——— minor, R. Br. Prodr., 329 | 33 |
| Acianthus caudatus, R. Br. Prodr., 321 | 55 |
| ——— exsertus, R. Br. Prodr., 321 | 56 |
| ——— viridis, J. Hook. Fl. Tasm. II., 372 | 57 |
| Eriochilus autumnalis, R. Br. Prodr., 323 | 59 |
| Lyperanthus nigricans, R. Br. Prodr., 325 | 30 |
| ——— Burnetti, F. M. Fragm. V., 96 | 31 |
| Cyrtostylis reniformis, R. Br. Prodr., 322 | 58 |
| Caladenia pulcherrima, F. M. Fragm. V., 93 | 61–65 |
| ——— latifolia, R. Br. Prodr., 324 | 66 |
| ——— suaveolens, G. Reichenb. Beitr., 67. | |
| ——— congesta, R. Br. Prodr., 324 | 70 |
| ——— carnea, R. Br. Prodr., 324 | 69, 71, 72 |
| ——— cœrulea, R. Br. Prodr., 324 | 68 |
| ——— deformis, R. Br. Prodr., 324 | 67 |
| ——— Menziesii, R. Br. Prodr., 325 | 60 |
| Chiologottis diphylla, R. Br. Prodr., 323 | 49 |
| ——— Gunnii, Lindl. Orch. Pl., 387 | 50 |
| Glossodia major, R. Br. Prodr., 326 | 73 |

### *Irideæ.*

| | |
|---|---|
| Diplarrhena Moræa, La Bill. Voy. I., 157, t. 15 | 81 |
| Patersonia glauca, R. Br. Prodr., 304 | 79 |
| ——— longiscapa, Sweet Fl. Austr., 39, t. 39 | 80 |
| Sisyrinchium pulchellum, R. Br. Prodr., 305 | 82 |
| Campynema lineare, La Bill. Specim. I., 93, t. 121 | 107 |

### *Amaryllideæ.*

| | |
|---|---|
| Hæmodorum distichophyllum, Hook. Icon., 866 | 83 |

| | |
|---|---|
| Hypoxis hygrometrica, La Bill. Specim. I., 82, t. 108 | 84 |
| ——— glabella, R. Br. Prodr., 289 | 85, 86 |

### *Liliaceæ.*

| | |
|---|---|
| Bartlingia sessiflora, F. M. in Pap. R. S. Tasm. 1877, p. 116 | 135 |
| Astelia alpina, R. Br. Prodr., 291 | 136 |
| Milligania longifolia, J. Hook. in Kew, Misc. V., 296, t. IX. | 138 |
| ——— densiflora, J. Hook. in Kew, Misc. V., 297 | 139 |
| ——— stylosa, F. M. in Pap. R. S. Tasm. 1876, p. 11. | |
| ——— Johnstoni, F. M. Benth. Flor. Austr. VII., 27. | |
| Burchardia umbellata, R. Br. Prodr., 273 | 103 |
| Wurmbsea dioica, F. M. in Pap. R. S. Tasm. 1877, 116 | 104, 105 |
| Hewardia Tasmanica, J. Hook. Icon. Pl., 858 | 106 |
| Drymophila cyanocarpa, R. Br. Prodr., 292 | 108 |
| Blandfordia marginata, Herb. in Bot. Reg. 1842, Misc., 93 | 109 |
| Chamæscilla corymbosa, F. M. Fragm. VIII., 68 | 117 |
| Cæsia parviflora, R. Br. Prodr., 277 | 118 |
| ——— vittata, R. Br. Prodr., 277 | 119 |
| Chlorophytum alpinum, Bak. in Journ. Linn. Soc. XV., 329 | 120 |
| Arthropodium strictum, R. Br. Prodr., 276 | 113, 114 |
| ——— paniculatum, R. Br. Prodr., 276 | 110, 111, 112 |
| Thysanotus Patersoni, R. Br. Prodr., 284 | 121 |
| Bulbine semibarbata, Haw. Revis., 33 | 116 |
| ——— bulbosa, Haw. Revis., 33 | 115 |

| | |
|---|---|
| Triglochin striata, Ruiz and Pav. Fl. Peruv. III., 73 | 91 |
| ———— centrocarpa, Hook. Icon., t. 728 | 92 |
| Potamogeton obtusifolius, Mert. and Koch. Deutschl. Fl. I., 855 | 96 |
| ———— prælongus, Wulf. in Rœm. Arch. III., 331. | |
| ———— perfoliatus, L. Sp. Pl., 126. | |
| ———— natans, L. Sp. Pl., 126 | 94, 95 |
| ———— marinus, L. Sp. Pl., 127. | |
| Ruppia maritima, L. Sp. Pl., 127 | 97 |
| Lepilæna Preissii, F. M. Fragm. VIII., 217 | 98 |
| Posidonia australis, J. Hook. Fl. Tasm. II., 43 | 99 |
| Cymodocea antarctica, Endl. Genpl., 230 | 100 |
| Zostera Muelleri, Jrmisch in Linnæa, 1867, p. 168. | |
| ——— Tasmanica, Martens in Linnæa, 1867, 168 | 101 |
| Halophila ovalis, Gaud. Voy. Freycin. Bot., 470, t. 40 | 102 |

*Lemnaceæ.*

| | |
|---|---|
| Lemna minor, L. Sp. Pl., 970 | 88 |
| ——— trisulca, L. Sp. Pl., 790 | 89 |

*Typhaceæ.*

| | |
|---|---|
| Typha Brownii, Kunth. Enum. III., 92 | 90 |
| ——— Muelleri, Rohrb. in Verhandl. Brandenb., 1869, p. 95. | |

*Xerotideæ.*

| | |
|---|---|
| Xerotes longifolia, R. Br. Prodr., 262 | 149 |
| ——— glauca, R. Br. Prodr., 260 | 141 |

*Junceæ.*

| | |
|---|---|
| Luzula campestris, Cand. Fl. Franc. III., 161 | 156, 157 |
| Juncus planifolius, R. Br. Prodr., 259 | 142 |
| ——— cæspititius, E. Mey. in Lehm. Pl. Preiss. II., 47 | 143 |
| ——— falcatus, E. Meyer in Reliq. Hænk. II., 144 | 144 |
| ——— Holoschœnus, R. Br. Prodr., 259 | 148 |
| ——— maritimus, Lam. Encycl. III., 264 | 149 |
| ——— pauciflorus, R. Br. Prodr., 259 | 153, 154 |
| ——— capillareus, J. Hook. Fl. Tasm. II., 65 | 147 |
| ——— pallidus, R. Br. Prodr., 258 | 155 |
| ——— communis, E. Mey. Junc., 12 | 150, 151, 152 |
| ——— Brownii, F. M. Report, 1853, p. 19 | 146 |
| ——— bufonius, L. Sp. Pl., 328 | 145 |

*Restiaceæ.*

| | |
|---|---|
| Restio tetraphyllus, La Bill. Specim. II., 77, t. 226 and 227 | 164 |
| ——— complanatus, R. Br. Prodr., 245 | 161 |

| | |
|---|---|
| Restio oligocephalus, F. M. Fragm. VIII., 68 ........ | 160 |
| —— australis, R. Br. Prodr., 245 ................ | 162 |
| —— gracilis, R. Br. Prodr., 245.................. | 163 |
| Lepyrodia Muelleri, Benth. Fl. Austr. VII., 215. | |
| ———- Tasmanica, J. Hook. Fl. Tasm. II., 72, t. 135 | 165 |
| Calostrophus fastigiatus, F. M. in Pap. Roy. Soc. Tasm., 1878, p. 117. | |
| ——— elongatus, La Bill. Specim. II., 78, t. 228. | |
| ———- lateriflorus, F. M. Fragm. VIII., 87 .... | 169 |
| Leptocarpus simplex, R. Br. Prodr., 250 ............ | 166 |
| ——— tenax, R. Br. Prodr., 250 .............. | 167 |

### *Centrolepideæ.*

| | |
|---|---|
| Aphelia gracilis, Sond. in Linnæa, 1856, p. 227........ | 170 |
| ——- Pumilio, F. M. in Linnæa, 1856, p. 226 ...... | 171 |
| Centrolepis aristata, Rœm and Schult. Syst. Veg. I., 44. | 172 |
| ——— fascicularis, La Bill. Specim. I., 7, t. 1 .... | 174 |
| ——— strigosa, R. and S. Syst. Veg. I., 43 ...... | 173 |
| ——— monogyna, Benth. Flor. Austr. VII., 205.. | 176 |
| ——— pulvinata, Rœm. and Schult. Syst. Veg. I., 43 ........................................ | 175 |
| ——— muscoides, Hieron. Halle Abhandl. XII., 94. | 177 |
| ——— polygyna, Hieron. Halle Abhandl. XII., 96. | 179 |
| ——— glabra, F. M. in Halle Abhandl. XII., 95.. | 178 |
| Trithuria submersa, J. Hook Fl. Tasm. II., 78, t. 133.. | 180 |

### *Cyperaceæ.*

| | |
|---|---|
| Cladium radula, R. Br. Prodr., 237. | |
| ——— psittacorum, F. M. Fragm. IX., 13 | 229 |
| ——— melanocarpum, F. M. Fragm. IX., 13 | 230 |
| ——— glomeratum, R. Br. Prodr., 237 | 220 |
| ——— schœnoides, R. Br. Prodr., 236 | 224, 225 |
| ——— Gunnii, J. Hook. Fl. Tasm. II., 95, t. 148 | 221, 223 |
| ——— junceum, R. Br. Prodr., 237 | 222 |
| Lepidosperma filiforme, La Bill. Specim. I., 17, t. 15 | 218 |
| ——— laterale, R. Br. Prodr., 234 | 211 |
| ——— lineare, R. Br. Prodr., 235 | 214 |
| ——— squamatum, La Bill. Specim. I., 17, t. 16. | 215 |
| ——— concavum, R. Br. Prodr., 234 | 210, 212, 213 |
| ——— longitudinale, La Bill. Specim. I., 16, t. 13 | 209 |
| ——— elatius, La Bill. Specim. I., 15, t. 11 | 208 |
| ——— gladiatum, La Bill. Specim. I., 15, t. 12 | 207 |
| Oreobolus pumilio, R. Br. Prodr., 236 | 219 |
| Schœnus fluitans, J. Hook. Fl. Tasm. II., 81, t. 141 | 183 |
| Chætospora alpina, Endl. Gen., 113 | 191 |
| ——— tenuissima, J. Hook. Fl. Tasm. II., 80, t. 140 | 184 |
| ——— capillaris, F. M. Fr. IX., 34 | 185 |
| ——— nitens, R. Br. Prodr., 233 | 186 |
| ——— axillaris, R. Br. Prodr., 233 | 188 |
| ——— imberbis, R. Br. Prodr., 233 | 187 |
| ——— sphærocephala, R. Br. Prodr., 233 | 189 |
| Chorizandra enodis, Nees in Lehm. Pl. Preiss. II., 73 | 190 |
| Caustis pentandra, R. Br. Prodr., 240 | 231 |
| Carex acicularis, Boott in J. Hook. Fl. Nov. Zel. I., 280, t. 63 | 232 |
| ——— tereticaulis, F. M. Fragm. VIII., 256. | |
| ——— paniculata, L. Sp. Pl., ed. sec., 1383 | 234 |
| ——— chlorantha, R. Br. Prodr., 242 | 235 |
| ——— inversa, R. Br. Prodr., 242 | 233 |
| ——— cæspitosa, L. Sp. Pl., 978 | 236 |
| ——— Gunniana, Boott in Transact. Linn. Soc. XX., 143 | 237, 238 |
| ——— pumila, Thunb. Fl. Japon., 38 | 239 |
| ——— Bichenoviana, Boott in J. Hook. Fl. Tasm. II., 101. | |
| ——— flava L. Sp. Pl., 975 | 240 |
| ——— longifolia, R. Br. Prodr., 242 | 241 |
| ——— Pseudo-Cyperus, L. Sp. Pl., 978 | 242 |
| ——— breviculmis, R. Br Prodr., 242 | 243 |
| Uncinia tenella, R. Br. Prodr., 241 | 245 |
| ——— riparia, R. Br. Prodr., 241 | 246 |
| ——— compacta, R. Br, Prodr., 241 | 247, 248 |

### *Gramineæ.*

| | |
|---|---|
| Ehrharta distichophylla, La Bill. Specim. I., 90, t. 117.. | 249 |
| ——— junceæ, Spreng., Syst. II., 114 ............ | 250 |
| ——— acuminata, F. M. in Transact. Phil. Soc. Vict. I., 111 .......................................... | 251 |
| ——— stipoides, La Bill. Specim. I. 91, t. 118 .. | 252, 253 |
| ——— diarrhena, F. M. Fragm. VII., 89.......... | 254 |
| Stipa semibarbata, R. Br. Prodr., 174 ............... | 262 |
| —— pubescens, R. Br. Prodr., 174 ................ | 263 |
| —— flavescens, La Bill. Specim. I., 24, t. 30 ........ | 264 |
| —— setacea, R. Br. Prodr., 174.................... | 265 |
| —— teretifolia, Steud. Glum. I., 128................ | 268 |
| —— micrantha, Cav. Icon. V., 42, t. 467............ | 267 |
| —— pentapogon, F. M. Fragm. VIII., 106.......... | 280 |
| —— Dichelachne, Steud. Nomencl. II., 502.......... | 266 |
| Cinna ovata, Kunth. Gram. I., 167 ................. | 279 |
| Agrostis quadriseta, R. Br. Prodr., 171.............. | 271 |
| ——— scabra, Willd. Sp. Pl. I., 370 .............. | 269 |
| ——— venusta, Trin. Agrost. II., 94 .............. | 270 |
| ——— Solandri, F. M. Chath. Isl. Veg., 60 ...... | 272–274 |
| ——— æquata, Nees in Hook. Lond. Journ. II., 413.. | 273 |
| ——— scabra, R. Br. Prodr., 172 .............. | 275, 277 |
| ——— montana, R. Br. Prodr., 172 ............... | 276 |
| ——— frigida, F. M. First Gen. Report, 1853, p. 20. | |
| ——— Gunniana, F. M. in Pap. Roy. Soc. Tasm., 1878, p. 119. | |
| Hierochloa antarctica, R. Br. Prodr., 209............ | 259 |
| ——— alpina, Rœm. and Schult. Syst. Veg. II., 510 | 260 |

Poa cæspitosa, G. Forst. Prodr., p. 89 ............ 293, 295
—— Billardierii, Steud. Glum. I. 262.
—— saxicola, R. Br. Prodr., 180 ................ 294, 296
Zoysia pungens, Willd. in Berl. Verhandl. III., 440.
Hemarthria compressa, R. Br. Prodr., 207 .......... 257
Spinifex hirsutus, La Bill. Specim. II. 81, t. 230 ..... 256
Imperata arundinacea, Cyrill. Icon. Fasc. II., t. 11.
Phragmites communis, Trin. Fund., 134 ............ 281

## Acotyledoneæ.

### FILICES.

### *Lycopodiaceæ.*

Lycopodium Selago, L. Sp. Pl., 1102.
———— densum, La Bill. Specim. II. 104, t. 251.
———— laterale, R. Br. Prodr., 165.
———— Carolinianum, L. Sp. Pl., 1104.
———— clavatum, L. Sp. Pl., 1101.
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Tmesipteris Tannensis, Bernh. in Schrad. Journ. 1800, II., 131.
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———— circinata, Sw. Syn. Fil., 165.
———— dicarpa, R. Br. Prodr., 161.

### *Hymenophylleæ.*

Trichomanes venosum, R. Br. Prodr., 159.
Hymenophyllum demissum, Sw. Syn. Fil., 147.

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Cyathea medullaris, Sw. Syn. Fil., 141.
Dicksonia antarctica, La Bill. Specim. II. 100, t. 249.
Alsophila australis, R. Br. Prodr., 158.
———— excelsa, R. Br. Prodr., 158, var. Cooperi.

### *Polypodiaceæ.*

Davallia dubia, R. Br. Prodr., 157.
Polypodium punctatum, Thunb. Prodr. Flor. Cap. 169.
———— pustulatum, G. Forst. Prodr. n. 436.
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## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| error, ard to mean sea level. | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. 7·30 a.m. | | Wind. 4·30 p.m. | | Clouds. (0 to 10) 7·30 a.m. | | Clouds. (0 to 10) 4·30 p.m. | | Relative Humidity. Per cent | | Rain in Inches | Spon. Evap. | Ozone. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. | 7·30 a.m. | 7·30 a.m. |
| 29·828 | 14· | 58· | 72· | 128· | 76· | 38· | N | 0 | S | ·62 | K | 10 | K | 5 | 76 | 61 | 0 | | 5· |
| 29·304 | 17· | 62· | 84· | 120· | 86· | 41· | NW | ·26 | NW | 5·21 | K | 10 | K | 10 | 67 | 37 | 0 | | 6· |
| 29·898 | 15· | 60· | 72· | 121· | 82· | 40· | NW | 2·60 | S | ·52 | K | 2 | K | 3 | 52 | 53 | ·02 | | 4· |
| 29·676 | 19· | 66· | 84· | 125· | 89· | 41· | N | ·52 | N | 2·60 | K | 2 | K | 4 | 48 | 48 | 0 | | 6· |
| 30·094 | 21· | 70· | 68· | 118· | 72· | 42· | SW | 0 | SE | ·52 | K | 2 | K | 2 | 72 | 60 | 0 | | 4· |
| 30·111 | 20· | 67· | 72· | 124· | 79· | 39· | N | ·26 | SE | ·52 | K | 4 | K | 3 | 66 | 61 | 0 | | 6· |
| 29·712 | 23· | 73· | 87· | 1 0· | 93· | 45· | NW | ·52 | SE | ·65 | 0 | 0 | KN | 9 | 58 | 66 | 0 | | 2· |
| 29·812 | 15· | 60· | 61· | 81· | 80· | 38· | SE | ·26 | S | ·26 | N | 10 | K | 10 | 66 | 88 | ·12 | | 10· |
| 29·756 | 13· | 56· | 69· | 119· | 76· | 34· | S | 0 | S | 2·60 | K | 5 | K | 4 | 61 | 73 | ·01 | 2·25 | 7· |
| 29·805 | 14· | 58· | 65· | 105· | 71· | 35· | S | 2·60 | SW | ·26 | K | 9 | K | 6 | 71 | 83 | 0 | | 5· |
| 29·764 | 12· | 55· | 62· | 110· | 71· | 34· | N | ·52 | W | ·52 | K | 6 | K | 9 | 70 | 59 | 0 | | 4· |
| 29·694 | 9· | 49· | 58· | 76· | 63· | 34· | NW | 0 | SW | 2·60 | K | 8 | KN | 10 | 76 | 75 | ·02 | | 8· |
| 29·907 | 11· | 52· | 64· | 92· | 72· | 36· | NW | ·52 | SE | 52 | K | 7 | K | 8 | 56 | 77 | ·03 | | 6· |
| 29·891 | 12· | 55· | 71· | 105· | 79· | 38· | NW | ·26 | SE | 2·60 | K | 7 | KS | 5 | 81 | 78 | ·01 | | 3· |
| 29·677 | 15· | 60· | 72· | 117· | 92· | 40· | NW | 2·60 | E | ·52 | K | 2 | K | 10 | 71 | 69 | 0 | | 6· |
| 30·015 | 11· | 56· | 63· | 110· | 82· | 37· | W | 0 | W | ·0 | 0 | 0 | 0 | 4 | 70 | 88 | 0 | | 4· |
| 29·898 | 15· | 59. | 69· | 110· | 75· | 38· | NW | ·52 | SE | 2·60 | K | 3 | K | 1 | 66 | 61 | 0 | | 5· |
| 29·942 | 14· | 53· | 68· | 117· | 73· | 37· | W | 0 | SW | 2.60 | K | 8 | K | 10 | 66 | 46 | 0 | | 7· |
| 30·154 | 12·5 | 57· | 66· | 110· | 68· | 38· | SE | ·26 | SE | 2·60 | 0 | 0 | 0 | 0 | 57 | 88 | 0 | 2·0 | 5· |
| 29·881 | 13· | 55· | 76· | 118· | 80· | 39· | SE | 0 | E | ·52 | K | 4 | K | 9 | 80 | 52 | 0 | | 5· |
| 29·722 | 17· | 63· | 79· | 105· | 82· | 40· | N | ·52 | N | ·52 | K | 3 | K | 9 | 77 | 56 | 0 | | 3· |
| 29·950 | 14· | 58· | 64· | 95· | 78· | 35· | S | 0 | SE | 2·60 | KN | 10 | K | 9 | 76 | 63 | 0 | | 10· |
| 29·971 | 14· | 58· | 69· | 90· | 73· | 36· | N | 0 | SE | ·26 | K | 2 | K | 10 | 76 | 73 | 0 | | 6· |
| 29·6·8 | 17· | 63· | 75· | 120· | 83· | 40· | NE | 0 | S | ·52 | K | 8 | KN | 3 | 100 | 83 | ·02 | | 5· |
| 29·684 | 15· | 59· | 60· | 90· | 75· | 36· | SE | ·26 | S | ·52 | KN | 10 | 0 | 0 | 74 | 63 | ·55 | | 6· |
| 30·052 | 11· | 52· | 65· | 110· | 76· | 34· | NE | ·26 | S | ·52 | K | 4 | 0 | 0 | 70 | 64 | ·02 | | 9· |
| 30·077 | 12·5 | 55· | 69· | 109· | 76· | 37· | SW | 0 | SE | 2·60 | K | 3 | K | 8 | 70 | 58 | 0 | | 5· |
| 29·887 | 16· | 61· | 73· | 112· | 79· | 40· | NW | ·26 | SE | ·0 | K | 3 | 0 | 0 | 77 | 69 | 0 | | 5· |
| 29·741 | 16· | 62· | 70. | 120· | 82· | 40· | NW | ·26 | S | ·52 | 0 | 0 | KS | 6 | 77 | 62 | 0 | | 3· |
| 29·635 | 15·5 | 60· | 73· | 97· | 80· | 39· | N | 0 | SE | 2·60 | K | 10 | K | 4 | 62 | 83 | 0 | | 5· |
| 29·947 | 15· | 60· | 70 | 118· | 75· | 39· | NW | 2·60 | SE | 2·60 | K | 5 | 0 | 0 | 64 | 88 | 0 | 2·17 | — |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Press.<br>'56 | Mean<br>7·39 | M'n. Tem.<br>64·55 | Mean.<br>109·45 | Mean<br>78·16 | Mean<br>38·00 | Mean Force<br>·90 lb. | Mean for Month.<br>5·30 | Mean<br>·68 | Tl.<br>·80 | Tl.<br>6·42 | Tl.<br>160 |
| st do.<br>173 | Max.<br>23·00 | | Max.<br>128·00 | Max.<br>93·00 | Max.<br>45·00 | Greatest Force<br>2·60 lb. | Prev. Character,<br>K | | | | Mean<br>5.33 |
| ; do.<br>304 | Min.<br>9·00 | | Min.<br>76·00 | Min.<br>68·00 | Min.<br>34·00 | Least Force.<br>0 | | | | | |
| | | | | | | Prevailing Direction<br>SE, S, and NW. | | | | | |

orological form brought into use at the beginning ers in some respects from the former one. It has d with the view of assimilating the Hobart Town e closely with those of stations in Europe, America, der to co-operate in a system of International . Readings are added from the centigrade ther- hat being the instrument generally used on the f Europe.

is in all cases taken from the sums of the two ers, not from the maximum and minimum.

tion of the wind is registered from currents at a 2 feet above sea level, and its force in lbs. per

ve quantity of rain that fell under the different istered each morning at 7·30 a.m.

ears' standard tables are used for obtaining the om average.

FRANCIS ABBOTT, F.R.A.S., etc.

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afing, flowering, and fruiting *of a few standard* in the Botanic *Gardens during January*, 1879:—

*Apricot (Royal) gathered.*
*onel Pear ripe.*
*llea robusta in full flower.*
15th. *Veronica angustifolia* in full flower.
21st. Black Mulberries commencing to ripen.

F. ABBOTT, JUN., Superintendent.

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Results of observations taken at New Norfolk January, 187
in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:

Barometer.—Mean of two daily readings, corrected ar reduced, 29·979 inches.

Thermometer.—Mean of two ditto, 64·64 deg.
„ Ditto for January, 1878, 64·72 deg.
„ Mean of max. and min. in shade, 63·80de
Dew Point.—Mean position of two ditto, 53·08 deg.
Humidity.—Mean of two ditto, ·67.
Elastic Force of Vapour.—Mean of two ditto, ·405.
Solar Intensity.—Mean of max. temperature, 135·90 deg.
Terrestrial Radiation.—Mean of min temperature, 41·61 de
Rainfall —·40 inches; ditto January '78, ·41 inches; di '77, 1·01 inches; ditto, '76, 1·66 inches; ditto '75, 1·57 inc and '74, 1·25 inches.
Evaporation.—6·73 inches, in excess of rainfall, 6·33
Clouds.—Mean of two daily registers, 3·16.
Ozone.—Mean of two ditto, 6·90.

E. W. SHOOBRIDGE, B

# *METEOROLOGY FOR FEBRUARY, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| mean sea level. | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. | | | | Clouds. (0 to 10) | | | | Relative Humidity. Per cent | | Rain in Inches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 7·30 a.m. | | 4·30 p.m. | | 7·30 a.m. | | 4·30 p.m. | | | | |
| 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. |
| ·975 | 11·5 | 65· | 76· | 110· | 76· | 40· | N | 0 | SW | 2·60 | K | 5 | K | 2 | 51 | 73 | 0 |
| ·025 | 10·5 | 61· | 72· | 110· | 72· | 40· | NW | 0 | NW | ·0 | K | 3 | 0 | 0 | 74 | 68 | 0 |
| ·829 | 12· | 54· | 66· | 95· | 75· | 39· | N | ·26 | SE | ·52 | K | 4 | K | 6 | 81 | 68 | 0 |
| ·781 | 18· | 64· | 74· | 116· | 80· | 40· | NW | 0 | S | ·0 | K | 10 | K | 10 | 73 | 66 | 0 |
| ·569 | 17· | 62· | 79· | 122· | 90· | 39· | NW | 0 | SW | 10·42 | K | 10 | KS | 7 | 74 | 50 | 0 |
| ·900 | 12· | 56· | 65· | 115· | 79· | 37· | S | 0 | SE | ·26 | K | 10 | K | 10 | 81 | 68 | 0 |
| ·891 | 15· | 60· | 71· | 130· | 78· | 40· | SW | ·52 | SE | 2·60 | KN | 5 | K | 3 | 76 | 69 | 0 |
| ·802 | 13· | 56· | 68· | 88· | 74· | 35· | E | 0 | S | ·52 | K | 10 | K | 8 | 81 | 68 | ·02 |
| ·172 | 13· | 56· | 70 | 120· | 74· | 36· | NW | ·26 | SE | 2·60 | K | 4 | K | 2 | 66 | 68 | 0 |
| ·654 | 12·5 | 55· | 86· | 138· | 98· | 36· | N | 2·60 | N | 2·60 | K | 4 | K | 3 | 81 | 65 | 0 |
| ·883 | 13·5 | 57· | 75· | 135· | 90· | 38· | NW | 0 | NW | ·0 | K | 4 | K | 3 | 68 | 65 | 0 |
| ·894 | 13· | 56· | 70. | 126· | 75· | 39· | W | ·52 | W | ·52 | KN | 3 | K | 3 | 66 | 43 | ·25 |
| ·821 | 14· | 58· | 75· | 130· | 80· | 40· | NW | ·26 | SE | ·26 | K | 4 | K | 6 | 76 | 55 | 0 |
| ·817 | 12· | 54· | 65· | 120· | 75· | 40· | S | 0 | S | ·52 | K | 9 | K | 6 | 93 | 77 | 0 |
| ·063 | 12· | 56· | 62· | 120· | 66· | 39· | NW | ·26 | S | ·52 | K | 9 | K | 7 | 70 | 67 | ·01 |
| ·151 | 12·5 | 55· | 65· | 130· | 70· | 38· | N | 0 | SE | ·52 | K | 10 | KS | 6 | 71 | 73 | ·02 |
| ·155 | 11·5 | 53· | 65· | 130· | 70· | 37· | SE | 0 | SE | ·52 | K | 5 | K | 8 | 75 | 67 | 0 |
| ·955 | 13· | 58· | 64· | 110· | 68· | 39· | E | 0 | SE | ·0 | N | 10 | K | 10 | 76 | 70 | 0 |
| ·646 | 12· | 54· | 70· | 130· | 77· | 38· | N | 0 | S | ·52 | KN | 10 | K | 3 | 70 | 68 | 0 |
| ·183 | 14· | 58· | 75· | 135· | 82· | 36· | W | ·26 | S | 2·60 | KN | 5 | K | 8 | 71 | 84 | 0 |
| ·128 | 11· | 52· | 62· | 108· | 80· | 34· | SW | 2·60 | SW | 6·42 | K | 10 | K | 8 | 93 | 47 | 0 |
| ·120 | 12· | 54· | 59· | 96· | 72· | 35· | W | ·52 | SW | 2·60 | 0 | 0 | KN | 10 | 66 | 88 | ·09 |
| ·870 | 10· | 50· | 54· | 120· | 65· | 33· | NW | 2·60 | W | 2·60 | K | 3 | K | 6 | 68 | 81 | ·04 |
| ·042 | 10· | 50· | 65· | 116· | 74· | 33· | NW | 0 | S | ·52 | K | 1 | K | 4 | 86 | 52 | ·01 |
| ·791 | 10· | 50· | 69· | 130· | 73· | 33· | W | ·26 | S | ·0 | K | 10 | K | 9 | 74 | 88 | ·04 |
| ·422 | 12·5 | 55· | 81· | 136· | 86· | 36· | N | ·26 | NW | 5.21 | K | 10 | K | 10 | 70 | 66 | 0 |
| 573 | 11·5 | 53· | 62· | 125· | 78· | 33· | NW | 2·60 | NW | ·52 | K | 8 | K | 3 | 64 | 48 | ·11 |
| ·601 | 7·5 | 46· | 67· | 125· | 73· | 34· | NW | 0 | NW | 2·60 | K | 8 | K | 8 | 86 | 64 | ·01 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ress.<br>7 | Mean<br>12·37 | M'n. Tem.<br>62·32 | Mean.<br>120·0 | Mean<br>76·80 | Mean<br>37·00 | Mean Force<br>1·31 lb. | Mean for Month.<br>6·50 | Mean<br>·71 | Tl.<br>·60 | T<br>4· |
| do.<br>3 | Max.<br>18·00 | | Max.<br>138·0 | Max.<br>98·00 | Max.<br>40·00 | Greatest Force<br>10·42 lb. | Prev. Character,<br>K | | | |
| do.<br>1 | Min.<br>7·50 | | Min.<br>88·0 | Min.<br>65·00 | Min.<br>33·00 | Least Force.<br>0<br>Prevailing Direction<br>NW, S, and SE. | | | | |

**ological form brought into use at the beginning s in some respects from the former one. It has with the view of assimilating the Hobart Town closely with those of stations in Europe, America, r to co-operate in a system of International Readings are added from the centigrade ther- t being the instrument generally used on the Europe.**

**s in all cases taken from the sums of the two s, not from the maximum and minimum.**

**on of the wind is registered from currents at a feet above sea level, and its force in lbs. per**

**e quantity of rain that fell under the different tered each morning at 7·30 a.m.**

**The 35 years' standard tables are used for ob difference from average.**

**FRANCIS ABBOTT, F.R..**

**Time of leafing, flowering, and fruiting of a fe plants in the Botanic Gardens during Februa**

**7th.—Kerry Pippin commencing to ripen.**
**10th.—Windsor Pear ditto.**
**14th.—Bon Chretien Pear ditto.**
**16th.—Green Gage Plum ditto.**
**18th.—Ash commencing to shed seed.**
**20th.—Sycamore ditto.**

**F. ABBOTT, JUN., Superi**

# *METEOROLOGY FOR MARCH, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.
(Registered for the Royal Society of Tasmania.)

| mean sea level. | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Relative Humidity. Per cent | | Clouds. | | | | | Wind. | | | Rain in Inches | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 7·30 a.m. | | 4·30 p.m. | | | 7·30 a.m. | 4·30 p.m. | | | |
| 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | 7·30 a.m. | 4·30 p.m. | Character. | Amount. | Character. | Amount. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | 7·30 a.m. | |
| ·907 | 10· | 50· | 63· | 120· | 70· | 36· | 86 | 66 | K | 7· | K | 7· | W | 0 | W | 2·60 | | |
| ·110 | 8· | 47· | 69· | 131· | 65· | 34· | 73 | 38 | K | 3· | K | 2· | NW | 0 | S | ·52 | | |
| ·101 | 9· | 49· | 65· | 120· | 67· | 35· | 86 | 55 | K | 10· | K | 6· | NW | 0 | S | ·52 | | |
| ·972 | 11·5 | 53· | 65· | 1[illegible]8· | 68· | 36· | 80 | 59 | K | 10· | K | 4· | SE | 0 | NE | ·52 | | |
| ·848 | 13· | 56· | 68· | 132· | 73· | 38· | 62 | 68 | KS | 5· | CK | 5· | NW | 0 | SE | ·52 | | |
| ·528 | 15· | 60· | 74· | 136· | 83· | 39· | 67 | 58 | KN | 10· | KN | 9· | NW | ·62 | SW | 2·60 | | |
| ·897 | 10· | 50· | 62· | 115· | 74· | 3[illegible]· | 74 | 77 | K | 3· | K | 7· | NW | ·26 | S | ·26 | ·15 | |
| ·915 | 12· | 54· | 66· | 85· | 68· | 37· | 75 | 88 | K | 7· | KN | 10· | NW | 0 | NW | 0 | ·01 | |
| ·831 | 12· | 56· | 75· | 130· | 78· | 40· | 75 | 45 | K | 8· | 0 | 0· | NW | ·26 | NW | 0 | ·11 | |
| ·883 | 10·5 | 51· | 75· | 138· | 82· | 28· | 74 | 65 | 0 | 0· | K | 2· | N | ·26 | W | ·26 | | 1 |
| ·098 | 13· | 56· | 63· | 92· | 76· | 40· | 87 | 72 | K | 8· | K | 9· | SE | ·26 | SE | ·26 | ·04 | |
| ·028 | 11· | 54· | 61· | 90· | 68· | 36· | 81 | 64 | K | 10· | K | 4· | SE | 0 | NE | ·26 | ·01 | |
| ·845 | 13· | 56· | 58· | 78· | 64· | 37· | 76 | 88 | K | 10· | KN | 10· | N | 0 | W | 0 | | |
| ·876 | 13· | 56· | 62· | 84· | 65· | 37· | 93 | 82 | KN | 10· | KN | 10. | S | 0 | SW | 0 | 1·55 | |
| ·658 | 11· | 55· | 58· | 93· | 65· | 36· | 75 | 71 | KN | 7· | K | 8· | SW | ·26 | N | ·52 | ·10 | |
| ·728 | 11· | 54· | 54· | 75· | 60· | 36· | 86 | 80 | K | 10· | K | 10· | S | ·26 | SW | 2·60 | ·01 | |
| ·945 | 9· | 49· | 52· | 95· | 56· | 34· | 74 | 93 | K | 10· | KN | 10· | SW | ·26 | SE | 0 | | |
| ·938 | 10· | 50· | 55· | 93· | 58· | 35· | 86 | 81 | K | 6· | K | 10· | S | ·26 | S | 0 | ·04 | |
| ·065 | 6· | 43· | 62· | 85· | 65· | 33· | 85 | 67 | K | 4· | K | 7· | NW | 0 | NW | 0 | ·02 | |
| ·187 | 10· | 50· | 72· | 125· | 78· | 36· | 80 | 58 | 0 | 0· | K | 2· | W | ·26 | N | ·26 | | |
| ·128 | 15· | 60· | 70· | 120· | 75· | 38· | 72 | 78 | K | 10· | K | 4· | W | ·26 | S | ·52 | | |
| ·191 | 14· | 58· | 65· | 96· | 72· | 36· | 77 | 83 | K | 9· | K | 8· | SW | 0 | SE | ·26 | | |
| ·125 | 13· | 56· | 58· | 90· | 65· | 35· | 93 | 88 | KN | 10· | K | 10· | SE | 0 | SE | 0 | ·02 | |
| ·974 | 12· | 54· | 63· | 93· | 65· | 34· | 86 | 33 | K | 10· | K | 10· | NE | ·26 | NW | 0 | | |
| ·896 | 12· | 55· | 65· | 121· | 71· | 34· | 81 | 78 | K | 6· | K | 4. | NW | ·26 | NW | 0 | ·10 | |
| ·167 | 10· | 50· | 55· | 91· | 64· | 33· | 80 | 81 | K | 9· | KN | 10· | W | 0 | S | 2·60 | | |
| ·247 | 6· | 42· | 61· | 95· | 66· | 31· | 92 | 58 | KS | 3· | K | 7· | W | 0 | E | ·52 | | |
| ·864 | 13· | 55· | 62· | 95· | 61· | 37· | 86 | 67 | KN | 10· | K | 6· | NW | ·26 | NW | ·26 | ·04 | |
| ·514 | 10· | 50· | 57· | 76· | 65· | 35· | 86 | 66 | K | 4· | K | 5· | NW | ·26 | NW | 2·60 | ·02 | |
| ·979 | 7· | 45· | 54· | 78· | 58· | 32· | 73 | 75 | K | 7· | K | 8· | W | ·52 | S | ·52 | ·01 | |
| ·918 | 5·5 | 48· | 57· | 92· | 59· | 36· | 77 | 70 | K | 10· | K | 8· | W | 0 | NW | 0 | ·01 | |
| ress. 3 | Mean 10·00 | M'n. Tem. 57·42 | | Mean. 102·81 | Mean 68·00 | Mean 35·80 | Mean ·75 | | Mean for Month. 7·0 | | | | | Mean Force ·38 lb. | | | Tl. 2·24 | T 2· |
| do. 5 | Max. 15·00 | | | Max. 138·00 | Max. 83·00 | Max. 40·00 | | | Prev. Character, K | | | | | Greatest Force 2·60 lb. | | | | |
| lo. 5 | Min. 5·50 | | | Min. 75·00 | Min. 56·00 | Min. 31·00 | | | | | | | | Least Force. 0<br>Prevailing Direction NW, W., and S. | | | | |

ological form brought into use at the beginning
in some respects from the former one. It has
with the view of assimilating the Hobart Town
closely with those of stations in Europe, America,
r to co-operate in a system of International
Readings are added from the centigrade ther-
t being the instrument generally used on the
Europe.

s in all cases taken from the sums of the two
, not from the maximum and minimum.

n of the wind is registered from currents at a
feet above sea level, and its force in lbs. per

quantity of *rain that fell under* the different

winds is registered each morning at 7·30 a.m.

The 35 years' standard tables are used for obta
difference from average.

FRANCIS ABBOTT, F.R.A

Time of leafing, flowering, and fruiting of a few
plants in the Royal Society's Gardens during t
of March, 1879:—

7th.—Tips of Hornbeam commencing to turn bro
8th.—Coe's Golden Drop Plum ripe.
10th.—Seckle Pear commencing to ripen.
12th.—Tips of Elm turning yellow.
17th.—Horsechestnut Leaves turning brown.
18th.—Ash Leaves commencing to fall.
28th.—Oak Leaves commencing to fall.

F. ABBOTT, JUN., Supe

# *METEOROLOGY FOR APRIL, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| for temperature instrumental error, and to mean sea level. 7·30 a.m. | 4·30 p.m. | Thermometers (Reading.) Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Thermometers (Self-Registering.) Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Relative Humidity. Per cent a.m. | 4·30 p.m. | Clouds. 7·30 a.m. Character. | Amount. | 4·30 p.m. Character. | Amount. | Wind. 7·30 a.m. Direction from. | Force in lbs. per square foot. | 4·30 p.m. Direction from. | Force in lbs. per square foot. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ·903 | 29·918 | 6·5 | 44· | 57· | 92· | 59· | 34·5 | 86 | 61 | K | 2· | K | 8· | NW | 0 | NW | 0 |
| ·953 | 29·913 | 8· | 47· | 60· | 120· | 67· | 36· | 86 | 77 | K | 4· | K | 7· | N | ·26 | E | 0 |
| ·975 | 30·013 | 11· | 52· | 58· | 105· | 65· | 40· | 74 | 61 | K | 4· | 0 | 0· | W | 0 | SE | ·26 |
| ·950 | 30·248 | 10· | 50· | 55· | 110· | 61· | 37· | 69 | 71 | K | 8· | K | 9· | W | ·26 | S | ·52 |
| ·337 | 30·290 | 11· | 52· | 72· | 125· | 72· | 38· | 74 | 88 | K | 10· | K | 3· | N | ·26 | N | ·52 |
| ·982 | 29·793 | 15· | 60· | 75· | 125· | 78· | 37· | 76 | 66 | K | 8· | K | 8· | NW | 2·60 | NW | ·52 |
| ·913 | 29·906 | 15· | 59· | 64· | 121· | 74· | 37· | 58 | 73 | K | 3· | KS | 7· | NW | 0 | S | ·52 |
| ·932 | 29·873 | 11· | 56· | 61· | 120· | 67· | 36· | 94 | 88 | KN | 10· | K | 7· | S | 0 | S | 0 |
| ·922 | 29·936 | 12· | 56· | 63· | 115· | 65· | 37· | 87 | 80 | K | 9· | K | 6· | SW | 0 | W | ·26 |
| ·076 | 30·125 | 10· | 50· | 60· | 120· | 72· | 37· | 73 | 67 | K | 4· | K | 0· | SE | ·26 | S | ·26 |
| ·074 | 30·013 | 11· | 52· | 59· | 120· | 62· | 38· | 85 | 66 | K | 10· | K | 6· | S | 0 | S | ·26 |
| ·892 | 29·972 | 9· | 49· | 45· | 68· | 58· | 34· | 80 | 93 | KN | 10· | KN | 10· | S | 0 | S | ·52 |
| ·120 | 30·192 | 7· | 45· | 52· | — | 57· | 33· | 76 | 93 | N | 10· | KN | 10· | S | 2·60 | S | ·52 |
| ·245 | 30·194 | 5· | 41· | 56· | 100· | 58· | 33· | 87 | 70 | K | 4· | K | 3· | NW | 2·60 | N | ·26 |
| ·305 | 30·252 | 12· | 54· | 64· | 113· | 70· | 37· | 81 | 73 | K | 8· | K | 8· | NW | 2·00 | NW | 0 |
| ·360 | 30·225 | 9·5 | 49· | 63· | 95· | 69· | 35· | 93 | 73 | K | 10· | KS | 4· | NW | ·26 | SE | ·26 |
| ·258 | 30·082 | 9· | 49· | 72· | 125· | 74· | 36· | 86 | 84 | 0 | 0· | K | 1· | NW | ·26 | NW | 0 |
| ·035 | 29·902 | 9·5 | 49· | 65· | 112· | 72· | 36· | 86 | 55 | K | 6· | K | 7· | NW | 0 | SW | ·52 |
| ·287 | 30·339 | 10· | 50· | 54· | 110· | 67· | 38· | 69 | 81 | K | 7· | K | 9· | SW | 0 | S | ·52 |
| ·450 | 30·363 | 12· | 65· | 61· | 116· | 68· | 39· | 82 | 72 | K | 3· | KS | 2· | NW | ·52 | S | ·26 |
| ·291 | 30·222 | 6·5 | 45· | 69· | 114· | 72· | 36· | 85 | 60 | KN | 5· | K | 4· | N | ·52 | N | ·26 |
| ·229 | 30 231 | 11·5 | 53· | 73· | 124· | 78· | 33· | 75 | 54 | 0 | 0· | 0 | 0· | W | 0 | NW | ·26 |
| ·239 | 30·191 | 9. | 48· | 71· | 120· | 78· | 37· | 79 | 54 | 0 | 0· | K | 4. | W | ·52 | N | 0 |
| ·067 | 30 038 | 10· | 50· | 60· | 90· | 70· | 38· | 90 | 88 | K | 7· | K | 10· | NW | ·52 | NW | 0 |
| ·089 | 30·055 | 10· | 50· | 63· | 115· | 68· | 38· | 93 | 72 | KN | 10· | K | 5· | NW | 0 | SE | 0 |
| ·874 | 29·918 | 13· | 56· | 58· | 105· | 63· | 39· | 76 | 81 | K | 10· | K | 6· | NW | 0 | SW | ·52 |
| ·111 | 30·022 | 9· | 40· | 56· | 78· | 64· | 33· | 85 | 80 | KS | 3· | K | 10· | NW | 0 | N | 0 |
| ·792 | 29·584 | 9· | 49· | 69· | 115· | 74· | 37· | 80 | 56 | K | 7· | K | 10. | NW | 0 | N | 2·60 |
| ·468 | 29·545 | 13·5 | 57· | 53· | — | 58· | 40· | 94 | 82 | KN | 10· | KN | 10· | N | 0 | SE | ·52 |
| ·942 | 29·945 | 8· | 47· | 49· | — | 64· | 36· | 80 | 93 | KN | 10· | KN | 7· | S | ·52 | SW | ·26 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ean Press.<br>30·057 | Mean<br>10·10 | M'n. Tem.<br>56·0 | Mean.<br>98·80 | Mean<br>67·47 | Mean<br>36·67 | Mean<br>·78 | Mean for Month.<br>6·0 | Mean Force<br>·24 lb. |
| reatest do.<br>30·450 | Max.<br>15·0 | | Max.<br>120·0 | Max.<br>78·0 | Max.<br>40·0 | | Prev. Character,<br>K | Greatest Force<br>2·60 lb. |
| east do.,<br>29·468 | Min.<br>5·0 | | Min.<br>68·0 | Min.<br>57·0 | Min.<br>33·0 | | | Least Force.<br>0 |

Meteorological form brought into use at the beginning differs in some respects from the former one. It has lopted with the view of assimilating the Hobart Town more closely with those of stations in Europe, America, n order to co-operate in a system of International ology. Readings are added from the centigrade ther- er, that being the instrument generally used on the t of Europe.

mean is in all cases taken from the sums of the two gisters, not from the maximum and minimum.

lirection of the wind is registered from currents at a of 92 feet above sea level, and its force in lbs. per foot.

elative quantity of rain that fell under the different s registered each morning at 7·30 a.m.

The 35 years' standard tables are used fo difference from average.

FRANCIS ABBOTT,

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Time of leafing, flowering, fruiting etc., of plants in the Botanic Gardens, Hobar April, 1879:—

8th.—Elm Leaves commencing to fall.
10th.—Coe's Late Red Plum commencing t
20th.—Chinese Chrysanthemuses commenci
22nd.—Pyrus Aucuparia leaves commencin
25th —Black Mulberry leaves commencing
27th.—Seeds of Hornbeam ripe.

F. ABBOTT, JUN., S

# METEOROLOGY FOR MAY, 1879.

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| Bar. corrected for temperature instrumental error, and to mean sea level. | | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. | | | Clouds. | | | | | Relative Humidity. Per cent | | Rain in Inches | Spon. Evap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 7·30 a.m. | | 4·30 p.m. | 7·30 a.m. | | 4·30 p.m. | | | | | | |
| 7·30 a.m. | 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | Direction from. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. | 7·30 a.m. |
| 29·966 | 29·802 | 4· | 40· | 51· | — | 72· | 34· | ·52 | S | 2·60 | K | 6· | KN | 10· | NW | 85 | 86 | ·04 | |
| 30·028 | 30·078 | 13· | 55· | 50· | 95· | 65· | 36· | ·52 | S | ·26 | K | 6· | K | 8· | NW | 80 | 86 | ·07 | |
| 30·053 | 30·237 | 5· | 41· | 52· | 78· | 59· | 33· | 0 | S | ·52 | K | 8· | K | 7· | SW | 80 | 80 | ·01 | |
| 30·348 | 30·286 | 8· | 47· | 49· | — | 54· | 34· | 0 | S | ·26 | KN | 10· | K | 10· | S | 86 | 80 | ·08 | |
| 30·210 | 30·242 | 5·5 | 42· | 50· | 86· | 54· | 33· | 0 | NW | 0 | K | 10· | K | 10· | SW | 84· | 80 | ·05 | |
| 30·169 | 30 092 | 4· | 39· | 51· | 100· | 58· | 32· | 0 | NW | 0 | N | 4· | K | 7· | NW | 84 | 80 | ·01 | |
| 30·020 | 29·932 | 6· | 43· | 54· | 78· | 62· | 35· | ·26 | NW | 0 | K | 2· | KN | 10· | N | 81 | 86 | | |
| 30·139 | 30·141 | 4· | 39· | 51· | 102· | 56· | 33· | ·26 | NW | 0 | K | 7· | K | 5· | NW | 78 | 86 | | |
| 30·142 | 30·168 | 9· | 49· | 60· | 110· | 65· | 36· | ·52 | NW | ·52 | K | 7· | K | 2 | NW | 72 | 58 | ·01 | ·1 |
| 30·192 | 29·926 | 4· | 40· | 55· | 105· | 63· | 38· | 0 | E | 0 | K | 2· | K | 5· | NW | 71 | 81 | | |
| 29·962 | 29·918 | 6· | 43· | 50· | 105· | 63· | 37· | 0 | N | 0 | K | 3· | K | 2· | NW | 85 | 82 | | |
| 29·948 | 29·926 | 7·5 | 46· | 57· | 95· | 61· | 38· | 0 | N | ·26 | K | 2· | K | 10. | S | 93 | 87 | | |
| 30 039 | 30·028 | 10· | 50· | 59· | 97. | 58· | 40· | 0 | S | 0 | K | 4· | KN | 10· | S | 86 | 87 | ·02 | |
| 30·142 | 30·156 | 10· | 50· | 50· | 98. | 55· | 40· | 0 | S | ·52 | N | 2· | KN | 10· | S | 93 | 100 | ·04 | |
| 30·277 | 30·268 | 8· | 47· | 54· | — | 58· | 37· | 0 | S | ·52 | KN | 2· | KN | 10· | S | 93 | 93 | ·09 | |
| 30·292 | 30·245 | 8· | 47· | 50· | — | 53· | 37· | ·26 | S | 0 | KN | 2· | KN | 10· | S | 93 | 100 | ·12 | |
| 30·178 | 30·132 | 11· | 52· | 50· | 100· | 55· | 36· | 0 | S | ·52 | KN | 2· | N | 10· | S | 93 | 92 | ·07 | |
| 29·848 | 29·740 | 12· | 54 | 55· | -- | 58· | 37· | ·52 | S | ·26 | N | 2· | N | 10· | S | 94 | 94 | ·08 | |
| 29·645 | 29·675 | 10· | 53· | 58· | 82· | 60· | 39· | 0 | E | 0 | N | 2· | KN | 8· | S | 94 | 93 | ·15 | |
| 29·648 | 29·655 | 10· | 50· | 57· | 100· | 62· | 40· | 0 | N | 0 | K | 7· | KS | 9· | NE | 88 | 81 | ·01 | ·1 |
| 29·490 | 29·175 | 13· | 54· | 50· | 95· | 62· | 41· | ·26 | NW | 0 | KN | 2· | K | 7· | S | 94 | 88 | ·05 | |
| 29·373 | 29·371 | 9. | 49· | 59· | 96· | 65· | 38· | 0 | NW | ·52 | K | 7· | K | 7· | NW | 80 | 86 | | |
| 29·541 | 29·456 | 10· | 50· | 52· | 95· | 60· | 38· | 0 | S | ·56 | K | 9· | K | 9· | NW | 93 | 86 | | |
| 29·594 | 29·675 | 8· | 46· | 54· | 100· | 58· | 36· | 0 | NW | 0 | K | 10· | K | 4· | SE | 93 | 87 | ·01 | |
| 29·503 | 29·595 | 6·5 | 44· | 49· | 75· | 54· | 34· | 0 | S | 0 | K | 4· | K | 8· | N | 85 | 81 | ·01 | |
| 29·677 | 29·443 | 1· | 34· | 50· | 95· | 53· | 31· | 0 | NE | ·52 | K | 4· | K | 10· | SW | 98 | 80 | | |
| 29·616 | 29·743 | 4· | 59· | 50· | 91· | 57· | 33· | ·52 | N | ·26 | K | 2· | K | 4· | N | 92 | 86 | ·04 | |
| 29.914 | 29·945 | 4· | 39· | 51· | 85· | 54· | 34· | 0 | SW | 0 | KN | 10· | KN | 10. | SW | 100 | 93 | ·01 | |
| 29·923 | 29·982 | 11· | 52· | 52· | — | 55· | 36· | 2·60 | S | ·26 | KN | 10· | K | 7· | S | 87 | 86 | ·27 | |
| 30·056 | 30·085 | 10· | 50· | 50· | — | 54· | 37· | ·26 | SE | ·52 | KN | 10· | KN | 10· | SE | 86 | 93 | ·02 | |
| 30·092 | 30·034 | 8· | 47· | 52· | — | 54· | 34· | 0 | SE | 0 | KN | 10· | KN | 9· | S | 93 | 86 | ·03 | ·0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean Press. 29·924 | Mean 7·70 | M'n. Tem. 50·00 | Mean. 69·80 | Mean 58·30 | Mean 36·00 | Mean Force ·24 lb. | Mean for Month. 7·87 | Mean ·87 | Tl. 1·29 | Tl. ·28 |
| Greatest do. 30·348 | Max. 13·00 | | Max. 110·00 | Max. 72·00 | Max. 41·00 | Greatest Force 2·60 lb. | Prev. Character, K | | | |
| Least do., 29·175 | Min. 1·00 | | Min. 75·00 | Min. 53·00 | Min. 31·00 | Least Force. 0 | | | | |

ae Meteorological form brought into use at the beginning 876 differs in some respects from the former one. It has adopted with the view of assimilating the Hobart Town rds more closely with those of stations in Europe, America, in order to co-operate in a system of International eorology. Readings are added from the centigrade thermeter, that being the instrument generally used on the inent of Europe.

he mean is in all cases taken from the sums of the two registers, not from the maximum and minimum.

he direction of the wind is registered from currents at a ht of 92 feet above sea level, and its force in lbs. per re foot.

ae relative quantity *of rain that fell under the different* ls is *registered each morning at 7·30 a.m.*

The 35 years' standard tables are used for obtai difference from average.

FRANCIS ABBOTT, F.R.A.S

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Time of leafing, flowering, fruiting etc., of a few plants in the Botanic Gardens, Hobart Town the month of May, 1879:—

15th.—Medlar ripe.
20th.—Photinia serrulata commencing to flower.
25th.—Diosma alba commencing to flower.
26th.—Ailanthus leaves all fallen.
30th.—Coronilla glanca commencing to flower.

F. ABBOTT, Jun., Supe

# *METEOROLOGY FOR JULY, 1879.*

◆

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29.2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| Bar. corrected for temperature instrumental error, and to mean sea level. | | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. | | | | Clouds. | | | | Relative Humidity. Per cent | | Rain in Inches | Spon. Evap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 7·30 a.m. | | 4·30 p.m. | | 7·30 a.m. | | 4·30 p.m. | | | | | |
| 7·30 a.m. | 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. | 7·30 a.m. |
| 30·222 | 30·285 | 2· | 36· | 46· | 82· | 49· | 28· | S | ·52 | NW | ·52 | K | 6· | K | 2· | 84 | 79 | ·01 | |
| 30·220 | 30·283 | 1·5 | 35· | 48· | 85· | 55· | 34· | NW | ·26 | NW | ·26 | K | 9· | K | 2· | 94 | 86 | ·02 | |
| 30·210 | 30·446 | 10· | 50· | 47· | 96· | 51· | 33· | NW | ·26 | NW | 0 | K | 10· | K | 8· | 85 | 86 | | |
| 30·028 | 29·961 | 5· | 41· | 47· | 87· | 53· | 35· | W | 0 | N | 0 | K | 8. | K | 10· | 85 | 79 | | |
| 29·694 | 29·602 | 3·5 | 38· | 50· | 92· | 54· | 32· | NW | ·52 | NW | 0 | KS | 5· | KS | 9· | 84 | 80 | ·01 | |
| 29·259 | 29·322 | 2· | 35· | 50· | 96· | 55· | 30· | NW | 0 | NW | 0 | K | 10· | K | 8· | 83 | 86 | | |
| 29·372 | 29·293 | 6· | 44· | 52· | 76· | 54· | 30· | NW | 0 | NW | 0 | K | 5· | K | 10· | 73 | 80 | ·04 | |
| 29·493 | 29·443 | 6· | 43· | 50· | — | 54· | 36· | NW | ·52 | N | 0 | K | 9· | K | 10· | 72 | 85 | ·02 | |
| 29·562 | 29·556 | 6· | 43· | 44· | — | 52· | 36· | W | ·52 | SW | 0 | KN | 10· | KN | 10· | 84 | 92 | ·05 | ·1 |
| 29·763 | 29·943 | 5· | 41· | 44· | — | 48· | 34· | S | ·52 | S | 0 | K | 7· | K | 3· | 71 | 80 | ·12 | |
| 30·074 | 30·111 | 4· | 40· | 50· | 95· | 58· | 32· | W | ·26 | SW | ·26 | KN | 9· | 0 | 0· | 84 | 79 | ·01 | |
| 30·376 | 30·298 | 4· | 39· | 48· | 87· | 54· | 32· | W | 0 | NW | ·26 | K | 4· | K | 4· | 76 | 80 | ·01 | |
| 30·379 | 30 293 | 2· | 36· | 50· | 89· | 55· | 27· | NW | ·52 | NW | 0 | KN | 10· | KN | 10· | 84 | 80 | | |
| 30·119 | 29·948 | 6· | 43· | 51· | — | 53· | 29· | NW | 0 | NW | ·52 | K | 5· | K | 10· | 73 | 86 | ·12 | |
| 29·673 | 29·670 | 5· | 45· | 45· | 77· | 53· | 28· | NW | ·52 | NW | ·52 | K | 5· | K | 5· | 75 | 87 | ·03 | |
| 30 062 | 30·019 | 6· | 43· | 50· | — | 55· | 31· | NW | ·26 | NW | 0 | N | 7· | N | 10· | 84 | 80 | ·03 | ·1 |
| 30 055 | 30·037 | 8· | 47· | 53· | — | 58· | 34· | NW | ·26 | NW | 0 | K | 5· | K | 9· | 80 | 86 | ·01 | |
| 30·191 | 30·236 | 7· | 45· | 52· | 97· | 60· | 36· | NW | 0 | SE | 0 | K | 6. | K | 7· | 79 | 86 | ·04 | |
| 30·416 | 30·44 | 6· | 43· | 48· | — | 54· | 35· | E | 0 | NE | 0 | N | 10· | N | 10· | 85 | 93 | ·07 | |
| 30·210 | 30·243 | 4· | 39· | 49· | 75· | 53· | 31· | NW | ·52 | N | 0 | K | 6· | K | 3· | 92 | 80 | ·01 | |
| 30·066 | 30 009 | 7· | 35· | 45· | — | 51· | 35· | W | 0 | SW | ·52 | N | 10· | N | 10· | 85 | 86 | ·01 | |
| 30·064 | 30·037 | 8· | 38· | 51· | 79· | 58· | 30· | S | 0 | NW | ·52 | K | 5· | K | 4· | 64 | 74 | ·05 | |
| 29·9 2 | 29·898 | 10· | 50· | 51· | 77· | 54· | 33· | SW | ·26 | W | ·52 | K | 7· | K | 5· | 68 | 74 | ·04 | |
| 29·873 | 29·428 | 4· | 39· | 45· | — | 54· | 31· | NW | 0 | S | ·52 | K | 7· | K | 10· | 79 | 92 | | |
| 30·032 | 30·001 | 3· | 38· | 47· | 98· | 53· | 30· | W | ·52 | SE | ·26 | K | 7· | K | 4· | 84 | 86 | ·03 | |
| 30·052 | 30·042 | 4· | 40· | 50· | 79· | 54· | 31· | NW | ·26 | NW | 0 | K | 5· | K | 2· | 85 | 80 | ·01 | ·1 |
| 30·112 | 30·082 | 4· | 39· | 50· | 91· | 55· | 29· | NW | 0 | NW | 0 | K | 5· | K | 5· | 84 | 80 | ·01 | |
| 30·132 | 30·141 | 5· | 41· | 49· | 96· | 55· | 34· | NW | ·26 | NW | ·52 | K | 7· | K | 7· | 77 | 74 | | |
| 30·174 | 30·107 | 4· | 39· | 49· | — | 53· | 30· | NW | ·26 | NW | 0 | K | 10· | K | 10· | 84 | 74 | | |
| 30·101 | 30·042 | 5· | 41· | 50· | 70· | 53· | 35· | NW | 0 | NW | 0 | K | 10· | K | 9· | 77 | 86 | | |
| 29·919 | 29·941 | 5· | 42· | 53· | 75· | 55· | 34· | NW | 0 | NW | 0 | K | 8· | K | 9· | 78 | 74 | | ·1 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Mean Press.** 29·983 | **Mean** 5·10 | **M'n. Tem.** 44·87 | **Mean.** 58·00 | **Mean** 54·00 | **Mean** 32·10 | **Mean Force** ·19 lb. | Mean for Month. ·7 | Mean ·81 | Tl. ·62 | Tl. ·5 |
| **Greatest do.** 30·446 | **Max.** 10·00 | | **Max.** 98·00 | **Max.** 60·00 | **Max.** 36·00 | **Greatest Force** ·52 lb. | Prev. Character, K | | | |
| **Least do.,** 29·259 | **Min.** 1·50 | | **Min.** 0 | **Min.** 48·00 | **Min.** 27·00 | **Least Force.** 0 | | | | |

he Meteorological form brought into use at the beginning 876 differs in some respects from the former one. It has n adopted with the view of assimilating the Hobart Town ords more closely with those of stations in Europe, America, , in order to co-operate in a system of International eorology. Readings are added from the centigrade thermeter, that being the instrument generally used on the tinent of Europe.

he mean is in all cases taken from the sums of the two y registers, not from the maximum and minimum.

he direction of the wind is registered from currents at a ht of 92 feet above sea level, and its force in lbs. per re foot.

e relative quantity of rain that fell under the different ls is registered each morning at 7·30 a.m.

*FRANCIS ABBOTT, F.R.A.S.*, etc.

Time of leafing, flowering, fruiting etc., of a few plants in the Botanic Gardens, Hobart Tow the month of July, 1879 :—

18th.—Cytisus leucanthus commencing to flower.
25th.—Arbutus unedo commencing ditto.
28th.—Garrya elliptica commencing ditto.
30th.—Yellow Crocus commencing ditto.
31st.—Common Almond commencing ditto.
31st.—White Mulberry commencing ditto.

F. ABBOTT, JUN., Superint

# *METEOROLOGY FOR AUGUST, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29·2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| Bar. corrected for temperature instrumental error, and to mean sea level. | | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. 7·30 a.m. | | Wind. 4·30 p.m. | | Clouds. 7·30 a.m. | | Clouds. 4·30 p.m. | | Relative Humidity, Per cent | | Rain in Inches | Spon. Evap. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7·30 a.m. | 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. | ·30 a.m. |
| 29·849 | 29·838 | 8· | 47· | 50· | 96· | 55· | 36· | NW | 0 | SE | 0 | K | 8· | K | 8· | 86 | 93 | ·01 | |
| 29·913 | 29·872 | 5· | 41· | 50· | 57· | 55· | 38· | SE | 0 | NW | 2·60 | K | 6· | N | 10· | 78 | 68 | ·01 | |
| 30·125 | 29·964 | 2· | 36· | 44· | 0 | 53· | 34· | S | 0 | S | ·52 | KN | 10· | N | 10· | 83 | 73 | ·63 | |
| 30·061 | 29·986 | 5· | 41· | 45· | 65· | 48· | 30· | SW | ·26 | N | 0 | N | 10· | K | 6· | 84 | 86 | ·28 | |
| 30·064 | 30·348 | 5· | 42· | 48· | 95· | 50· | 29· | NW | ·52 | SW | ·26 | K | 4· | N | 10· | 84 | 73 | ·02 | |
| 30·225 | 30·441 | 4· | 39· | 52· | 90· | 54· | 28· | W | 2·60 | NW | 0 | K | 4· | K | 3· | 92 | 80 | ·01 | |
| 30·464 | 30·483 | 4· | 40· | 47· | 75· | 52· | 29· | NW | ·26 | NE | ·26 | K | 8· | K | 10· | 85 | 67 | | |
| 30·314 | 30·259 | 6·5 | 44· | 50· | 93· | 55· | 29· | NE | ·26 | S | ·26 | K | 8· | K | 10· | 86 | 86 | | |
| 30·013 | 29·942 | 9· | 48· | 50· | 67· | 56· | 34· | N | ·52 | N | 0 | K | 7· | K | 10· | 93 | 80 | ·06 | |
| 29·813 | 29·793 | 4· | 40· | 50· | 0 | 54· | 33· | NW | 0 | N | 0 | K | 10· | K | 8· | 85 | 74 | ·01 | |
| 29·850 | 29·691 | 6· | 44· | 51· | 97· | 57· | 34· | NW | 0 | NW | 0 | K | 10· | KN | 10· | 86 | 86 | | |
| 29·562 | 29·542 | 5· | 41· | 45· | 0 | 56· | 33· | NW | 0 | NW | 0 | K | 10· | N | 10· | 84 | 100 | ·45 | |
| 29·916 | 29·891 | 8· | 44· | 49· | 72· | 54· | 36· | S | 0 | S | ·26 | KN | 10· | K | 7· | 93 | 80 | ·38 | |
| 29·808 | 29·827 | 6· | 43· | 49· | 85· | 53· | 37· | E | 0 | E | 0 | K | 7· | K | 7· | 85 | 86 | ·01 | |
| 29·762 | 29·651 | 8· | 47· | 55· | 96· | 58· | 38· | W | ·26 | N | ·26 | K | 3· | K | 7· | 74 | 70 | ·02 | |
| 29·512 | 29·435 | 6· | 43· | 53· | 90· | 57· | 36· | NW | 0 | NE | ·26 | K | 10· | KN | 10· | 79 | 86 | | |
| 29·053 | 29·141 | 5· | 45· | 51· | 75· | 54· | 35· | N | 0 | NW | ·52 | K | 9· | K | 7· | 86 | 86 | ·20 | |
| 29·053 | 29·043 | 5· | 45· | 40· | 0 | 53· | 34· | N | ·26 | W | ·26 | K | 9· | K | 9· | 86 | 73 | ·10 | |
| 29·053 | 30·138 | 11· | 52· | 55· | 100· | 61· | 37· | N | ·52 | NW | ·52 | K | 7· | K | 10· | 86 | 75 | | |
| 30·264 | 30·168 | 10· | 50· | 59· | 100· | 63· | 38· | NW | ·52 | NW | ·26 | K | 5· | K | 6· | 74 | 66 | | |
| 30·164 | 30·074 | 9· | 49· | 59· | 96· | 65· | 34· | NW | ·52 | NW | ·26 | K | 8· | K | 10· | 74 | 66 | | |
| 30·273 | 30·142 | 7· | 45· | 55· | 72· | 64· | 34· | NW | 0 | | 0 | K | 10· | K | 10· | 79 | 75 | | |
| 30·208 | 30·091 | 10· | 51· | 61· | 106· | 66· | 37· | N | ·26 | N | ·26 | K | 7· | KN | 10· | 75 | 72 | | |
| 30·098 | 30·042 | 10·5 | 51· | 61· | 75· | 65· | 37· | NW | ·26 | NW | ·52 | K | 5· | K | 7· | 53 | 62 | | |
| 30·192 | 30·048 | 11·5 | 53· | 65· | 105· | 69· | 38· | NW | 0 | NW | 0 | K | 4· | K | 4· | 61 | 72 | | |
| 30·152 | 30·150 | 7· | 41· | 60· | 111· | 63· | 37· | SW | 0 | SE | 0 | K | 10· | KN | 10· | 79 | 76 | | |
| 30·291 | 30·214 | 10· | 50· | 56· | 105. | 62· | 38· | SE | 0 | E | 0 | KN | 10· | K | 3· | 80 | 75 | ·10 | |
| 30·197 | 30·015 | 9· | 49· | 60· | 110· | 65· | 37· | NE | 0 | SE | ·26 | K | 7· | K | 4· | 86 | 77 | | |
| 29·956 | 29·958 | 10· | 50· | 57· | 85· | 62· | 38· | NW | ·52 | S | ·52 | K | 8· | KN | 10· | 93 | 93 | | |
| 30·091 | 30·074 | 10· | 50· | 53· | 106· | 58· | 36· | S | ·26 | SE | ·52 | K | 8· | N | 4· | 83 | 74 | ·07 | |
| 30·313 | 30·228 | 6· | 43· | 52· | 73· | 55· | 34· | NW | 0 | SE | ·26 | K | 10· | K | 7· | 77 | 70 | ·01 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean Press. 30·00 | Mean 7·21 | M'n. Tem. 49·11 | Mean. 88·78 | Mean 57·80 | Mean 35·0 | Mean Force ·28 lb. | Mean for Month. ·8 | Mean ·80 | Tl. 2·37 | Tl. 1·9 |
| Greatest do. 30·483 | Max. 11·50 | | Max. 111·0 | Max. 69·00 | Max. 38·0 | Greatest Force 2·60 lb. | Prev. Character, K | | | |
| Least do., 29·043 | Min. 4·00 | | Min. 0 | Min. 48·00 | Min. 28·0 | Least Force. 0 | | | | |

he Meteorological form brought into use at the beginning 876 differs in some respects from the former one. It has adopted with the view of assimilating the Hobart Town rds more closely with those of stations in Europe, America, in order to co-operate in a system of International eorology. Readings are added from the centigrade ther- eter, that being the instrument generally used on the inent of Europe.

The mean is in all cases taken from the sums of daily registers, not from the maximum and minimum The direction of the wind is registered from curr height of 92 feet above sea level, and its force i square foot.

The relative quantity of rain that fell under the winds is registered each morning at 7·30 a.m.

FRANCIS ABBOTT, F.R.A.

[illegible]

# *METEOROLOGY FOR SEPTEMBER, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

Latitude 42° 52′ 13″ S.; Longitude 9h. 40m. 29·2s. E.
(Registered for the Royal Society of Tasmania.)

| error, and to mean sea level. | Thermometers (Reading.) | | | Thermometers (Self-Registering.) | | | Wind. | | | | Clouds. | | | | Relative Humidity. Per cent | | Rain in Inches | Spon. Evap. | Ozone. Chrom. Scale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 7·30 a.m. | | 4·30 p.m. | | 7·30 a.m. | | 4·30 p.m. | | | | | | |
| 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. | 7·30 a.m. | 7·30 a.m. |
| 29·985 | 6·5 | 44· | 52· | 100· | 65· | 38· | NW | 0 | N | ·52 | K | 3· | K | 6· | 79 | 51 | ·01 | | 4· |
| 29·625 | 12· | 54· | 59· | 105. | 68· | 43· | N | 0 | NW | ·52 | K | 7· | K | 7· | 63 | 68 | | | 2· |
| 29·925 | 12· | 54· | 55· | 107· | 61· | 44· | NW | ·52 | SW | ·52 | K | 7· | K | 8· | 65 | 61 | ·02 | | 4· |
| 30·242 | 9· | 49· | 52· | 75· | 57· | 40· | S | ·52 | SE | ·26 | K | 10· | K | 8· | 70 | 61 | ·01 | | 2· |
| 30·122 | 8· | 47· | 55· | 95· | 63· | 37· | N | 0 | SE | 0 | K | 7· | K | 5· | 79 | 75 | | | 4· |
| 29·971 | 9· | 49· | 56· | 107· | 63· | 39· | NW | ·26 | SE | ·26 | K | 7· | K | 7· | 80 | 70 | | | 3· |
| 30·018 | 10· | 50· | 62· | 105· | 65· | 42· | NW | ·52 | E | ·26 | K | 4· | K | 4· | 74 | 67 | | | 5· |
| 30·150 | 11· | 54· | 65· | 120· | 70· | 43· | NW | ·52 | SE | 0 | K | 3· | K | 3· | 71 | 64 | | | 2· |
| 30·221 | 12· | 54· | 67· | 75· | 67· | 45· | S | 0 | SE | 0 | K | 10· | K | 10· | 86 | 87 | | | 2· |
| 30·214 | 10· | 51· | 59· | 108· | 62· | 43· | NE | ·26 | NW | 5·21 | K | 8· | K | 8· | 74 | 62 | | ·34 | 4· |
| 30·208 | 11· | 56· | 65· | 114· | 68· | 46· | NW | ·26 | N | ·52 | K | 10· | K | 8· | 65 | 54 | | | 2· |
| 29·581 | 13· | 56· | 56· | 75· | 65· | 45· | NW | ·52 | NW | ·52 | KN | 10· | K | 7· | 93 | 71 | ·12 | | 5· |
| 29·782 | 11· | 56· | 61· | 108. | 65· | 45· | NW | ·26 | NW | ·52 | K | 4· | K | 4· | 61 | 62 | ·20 | | 4· |
| 30·089 | 10·5 | 51· | 61· | 118· | 65· | 41· | NW | ·52 | W | ·52 | K | 7· | K | 4· | 86 | 58 | .06 | | 2· |
| 30·234 | 11· | 52· | 56· | 98· | 62· | 42· | W | 0 | S | 0 | K | 10· | K | 10· | 86 | 75 | ·01 | | 4· |
| 30·141 | 9· | 49· | 58· | 117· | 65· | 40· | NW | ·26 | S | ·52 | K | 4· | K | 3· | 68 | 77 | | | 5· |
| 29·868 | 11· | 52· | 57· | 110· | 63· | 41· | SW | 0 | SE | 0 | K | 10· | K | 10· | 55 | 81 | | | 3· |
| 29·758 | 10· | 50· | 51· | 58· | 62· | 40· | S | 0 | S | ·52 | KN | 10· | N | 10· | 93 | 93 | ·04 | | 7· |
| 29·618 | 10· | 50· | 53· | 59· | 61· | 40· | S | ·26 | S | ·52 | KN | 10· | K | 9· | 93 | 92 | ·45 | | 10· |
| 29·918 | 9· | 49· | 58· | 100· | 62· | 36· | SW | ·26 | S | ·26 | K | 3· | K | 7· | 68 | 76 | ·01 | | 3· |
| 29·929 | 11· | 52· | 53· | 75· | 60· | 37· | S | ·26 | SE | ·26 | K | 7· | K | 6· | 74 | 80 | | ·10 | 7· |
| 29·718 | 12·5 | 55· | 61· | 89· | 64· | 41· | N | ·52 | NW | ·52 | K | 7· | K | 7· | 70 | 82 | | | 2· |
| 29·410 | 10·5 | 51· | 60· | 72· | 64· | 39· | N | 0 | NW | 0 | KN | 10· | K | 10· | 75 | 82 | ·04 | | 4· |
| 29·537 | 10·5 | 51· | 59· | 120· | 62· | 39· | NW | 0 | S | ·52 | K | 5· | K | 6· | 80 | 85 | ·09 | | 6· |
| 29·595 | 12·5 | 63· | 59· | 120· | 60· | 40· | NW | ·52 | NW | ·52 | K | 4· | K | 7· | 87 | 63 | ·12 | | 5· |
| 29·451 | 13· | 54· | 52· | 120· | 61· | 39· | SE | 0 | S | 0 | KN | 10· | KN | 10· | 75 | 93 | | | 3· |
| 29·606 | 10· | 57· | 59· | 113· | 63· | 37· | NW | ·26 | W | ·52 | K | 4· | K | 3· | 74 | 80 | ·04 | | 5. |
| 29·943 | 5· | 41· | 48· | 75· | 58· | 35· | SW | 0 | S | .52 | N | 10· | K | 5· | 84 | 93 | ·20 | | 5· |
| 29·927 | 9· | 49· | 55· | 112· | 60· | 38· | NW | ·52 | NW | 2·00 | K | 8· | K | 7· | 63 | 65 | ·26 | | 10· |
| 29·975 | 7· | 45· | 47· | 75· | 57· | 34· | SW | 2·60 | SW | ·52 | KN | 10· | KN | 9· | 73 | 80 | ·04 | ·50 | 3· |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Press.<br>990 | Mean<br>10·20 | M'n. Tem.<br>54·27 | Mean.<br>97·27 | Mean<br>63·43 | Mean<br>40·30 | Mean Force<br>0·46 lb. | Mean for Month.<br>7·0 | Mean<br>·75 | Tl.<br>·92 | Tl.<br>·94 | Tl.<br>127 |
| st do.<br>275 | Max.<br>12·50 | | Max.<br>120·00 | Max.<br>70·00 | Max.<br>46·00 | Greatest Force<br>5·21 lb. | Prev. Character,<br>K | | | | Mean<br>4·23 |
| do.,<br>724 | Min.<br>5·00 | | Min.<br>58·00 | Min.<br>57·00 | Min.<br>34·00 | Least Force.<br>0 | | | | | |

eorological form brought into use at the beginning ers in some respects from the former one. It has ed with the view of assimilating the Hobart Town re closely with those of stations in Europe, America, der to co-operate in a system of International y. Readings are added from the centigrade ther- hat being the instrument generally used on the Europe.

0 observations on atmospheric electricity, there sitive and 19 negative indications, with 3 nils; rce being 1,119.

The mean is in all cases taken from the sums of the tw daily registers, not from the maximum and minimum.

The direction of the wind is registered from currents at height of 92 feet above sea level, and its force in lbs. pe square foot.

The relative quantity of rain that fell under the differen winds is registered each morning at 7·30 a.m.

FRANCIS ABBOTT, F.R.A.S., etc.

# *METEOROLOGY FOR OCTOBER, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 18″ S.; Longitude 9h. 49m. 29·2s. E.**
**(Registered for the Royal Society of Tasmania.)**

| Day of Month. | Bar. corrected for temperature instrumental error, and to mean sea level. |  | Thermometers (Reading.) |  |  | Thermometers (Self-Registering.) |  |  | Wind. 7·30 a.m. |  | Wind. 4·30 p.m. |  | Clouds. 7·30 a.m. |  | Clouds. 4·30 p.m. |  | Relative Humidity. Per cent |  | Rain in Inches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 7·30 a.m. | 4·30 p.m. | Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Direction from. | Force in lbs. per square foot. | Direction from. | Force in lbs. per square foot. | Character. | Amount. | Character. | Amount. | 7·30 a.m. | 4·30 p.m. | 7·30 a.m. |
| 1 | 29·975 | 29·278 | 9· | 49· | 57· | 110· | 59· | 37· | N | 0 | SE | ·26 | K | 10· | K | 10· | 47 | 65 |  |
| 2 | 29·905 | 30·004 | 11· | 52· | 57· | 96· | 63· | 39· | SE | ·26 | NW | ·26 | K | 4· | K | 7· | 69 | 66 |  |
| 3 | 30·097 | 30·092 | 12·5 | 55· | 59· | 101· | 62· | 40· | SW | ·52 | SE | ·26 | K | 8· | K | 8· | 65 | 71 |  |
| 4 | 30·092 | 30·012 | 12· | 54· | 61· | 114· | 64· | 40· | N | ·26 | SW | ·52 | K | 5· | K | 2· | 87 | 67 |  |
| 5 | 29·943 | 29·822 | 13· | 56· | 68· | 106· | 73· | 40· | N | ·26 | NE | ·52 | K | 4· | K | 7· | 81 | 73 |  |
| 6 | 29·572 | 29·570 | 15· | 60· | 66· | 89· | 74· | 42· | NW | ·52 | NW | 2·60 | KN | 10· | K | 10· | 62 | 73 |  |
| 7 | 29·757 | 29·892 | 10·5 | 51· | 58· | 86· | 70· | 39· | NW | 0 | SE | ·52 | K | 10· | K | 10· | 93 | 66 |  |
| 8 | 30·058 | 30·065 | 8· | 47· | 56· | 105· | 68· | 36· | NW | ·26 | S | .52 | K | 9· | K | 7· | 73 | 70 |  |
| 9 | 29·911 | 29 822 | 11· | 52· | 56· | 118· | 69· | 40· | E | ·52 | S | 2·60 | K | 10· | K | 4· | 69 | 63 |  |
| 10 | 29·492 | 29·492 | 14· | 58· | 59· | 116· | 65· | 44· | NW | 0 | W | 2·60 | K | 6· | KN | 10· | 61 | 76 |  |
| 11 | 29·545 | 29·654 | 9· | 49· | 47· | 90· | 60· | 39· | NW | 0 | S | 2·60 | K | 3· | N | 10· | 86 | 93 |  |
| 12 | 30·013 | 29·978 | 9· | 49· | 52· | 110· | 58· | 39· | S | 0 | SE | ·52 | K | 5· | K | 5· | 69 | 69 |  |
| 13 | 30·124 | 30·127 | 12·5 | 55· | 61· | 112· | 67· | 40· | S | ·52 | SE | ·52 | K | 4· | K | 9· | 60 | 67 |  |
| 14 | 30·145 | 30·139 | 11· | 52· | 60· | 116· | 65· | 39· | N | 0 | S | 0 | K | 2· | K | 3· | 69 | 67 |  |
| 15 | 30·035 | 29·964 | 13· | 56· | 63· | 120· | 68· | 40· | NW | ·26 | SE | ·52 | K | 8· | K | 7· | 49 | 77 |  |
| 16 | 29·929 | 29·843 | 16· | 61· | 72· | 132· | 80· | 41· | NW | ·52 | SE | ·52 | K | 5· | K | 7· | 59 | 55 |  |
| 17 | 29·667 | 29·645 | 15· | 59· | 71· | 125· | 75· | 44· | NW | 0 | NW | ·26 | KN | 10· | K | 10· | 88 | 53 |  |
| 18 | 29·823 | 29·821 | 15· | 59· | 62· | 130· | 71· | 43· | S | 0 | S | ·26 | K | 7· | K | 10· | 67 | 64 |  |
| 19 | 29·785 | 29·626 | 11· | 52· | 55· | 63· | 63· | 41· | SE | 0 | SE | ·26 | N | 10· | KN | 10· | 93 | 81 |  |
| 20 | 29·535 | 29·517 | 12·5 | 55· | 62· | 63· | 64· | 39· | SE | ·52 | W | ·26 | KN | 9· | K | 9· | 70 | 62 |  |
| 21 | 29·645 | 29·737 | 15· | 60· | 63· | 125· | 70· | 40· | NW | ·52 | NW | ·52 | K | 5· | K | 9· | 72 | 68 |  |
| 22 | 29·306 | 29·345 | 20· | 68· | 70· | 125· | 73· | 44· | N | 2·60 | NW | 2·60 | K | 3· | K | 3· | 72 | 41 |  |
| 23 | 29·274 | 29·365 | 18· | 65· | 59· | 110· | 72· | 41· | NW | 2·60 | NW | ·26 | K | 5· | KN | 10· | 68 | 82 |  |
| 24 | 29·931 | 29·965 | 13· | 56· | 60· | 125· | 70· | 40· | N | 0 | S | ·52 | K | 4· | K | 5· | 87 | 66 |  |
| 25 | 30·058 | 30·171 | 12· | 54· | 59· | 125· | 68· | 39· | SE | ·26 | S | 2·60 | K | 6· | K | 4· | 71 | 71 |  |
| 26 | 30·173 | 30·052 | 13· | 56· | 66· | 125· | 71· | 40· | NW | ·52 | S | ·52 | K | 3· | KS | 6· | 71 | 68 |  |
| 27 | 29·786 | 29·698 | 13· | 56· | 62· | 110· | 66· | 40· | N | ·52 | NE | 2·60 | K | 6· | K | 10· | 60 | 55 |  |
| 28 | 29·429 | 29·358 | 14· | 58· | 65· | 115· | 72· | 41· | NW | ·52 | N | 2·60 | K | 2· | KN | 10. | 71 | 63 |  |
| 29 | 29·539 | 29·465 | 10· | 50· | 63· | 120· | 68· | 39· | NW | ·52 | W | 2·60 | K | 7· | K | 7· | 80 | 59 |  |
| 30 | 29·325 | 29·518 | 13· | 56· | 54· | 110· | 65· | 44· | W | 2·60 | NW | 2·60 | K | 7· | K | 5· | 57 | 66 |  |
| 31 | 29·613 | 29·742 | 12· | 56· | 62· | 130· | 65· | 44· | NW | 2·60 | NW | ·26 | K | 7· | K | 10· | 87 | 77 |  |
|  | Mean Press. 29·791 |  | Mean 12·68 | M'n. Tem. 58·00 |  | Mean. 109·50 | Mean | Mean | Mean Force 0·78 lb. |  |  |  | Mean for Month. 7· |  |  |  | Mean ·69 |  | Tl. 1·8 |
|  | Greatest do. 30·171 |  | Max. 20·00 |  |  | Max. 132·00 | Max. | Max. | Greatest Force 2·60 lb. |  |  |  | Prev. Character, K |  |  |  |  |  |  |
|  | Least do., 29·325 |  | Min. 8·00 |  |  | Min. 63·00 | Min. | Min. | Least Force. 0 |  |  |  |  |  |  |  |  |  |  |

**Of the 31 observations on atmospheric electricity, there were 19 positive and 6 negative indications, with 3 nils; the total force being 1,012.**

**The mean is in all cases taken from the sums of the two daily registers, not from the maximum and minimum.**

**The direction of the wind is registered from currents at a height of 92 feet above sea level, and its for square foot.**

**The relative quantity of rain that fell under winds is registered each morning at 7·30 a.m.**

**FRANCIS ABBOTT, F.**

## *METEOROLOGY FOR NOVEMBER, 1879.*

### PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29·2s. E.**
**(Registered for the Royal Society of Tasmania.)**

### BAROMETER AND THERMOMETER.

| Day of Month. | Bar. corrected for temperature instrumental error, and to mean sea level. 7·30 a.m. | 4·30 p.m. | Thermometers (Reading.) Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Thermometers (Self-Registering.) Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Wind. 7·30 a.m. Direction from. | Force in lbs. per square foot. | Wind. 4·30 p.m. Direction from. | Force in lbs. per square foot. | Clouds. 7·30 a.m. Character. | Amount. | Clouds. 4·30 p.m. Character. | Amount. | Relative Humidity, Per cent 7·30 a.m. | 4·30 p.m. | Rain in Inches 7·30 a.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29·872 | 29·747 | 16· | 58· | 69· | 110· | 74· | 44· | W | ·52 | NE | ·52 | K | 10· | K | 6· | 61 | 83 | ·01 |
| 2 | 29·767 | 29·765 | 15· | 60· | 67· | 112· | 73· | 44· | NE | ·26 | NW | 2·60 | K | 8· | K | 7· | 62 | 52 | ·01 |
| 3 | 29·745 | 29·718 | 15· | 59· | 66· | 125· | 72· | 40· | NW | 0 | SW | 2·60 | K | 10· | K | 6· | 45 | 56 | ·01 |
| 4 | 29·728 | 29·736 | 10· | 50· | 63· | 120· | 66· | 34· | W | ·52 | W | ·52 | KN | 10· | K | 7· | 68 | 58 | .01 |
| 5 | 29·743 | 29·748 | 11· | 52· | 56· | 110· | 65· | 36· | N | ·52 | S | ·52 | K | 10. | K | 6. | 69 | 70 | |
| 6 | 29·934 | 29·967 | 12· | 54· | 61· | 105· | 66· | 38· | SE | 0 | S | ·52 | K | 10· | KN | 10· | 70 | 77 | |
| 7 | 29·670 | 29·621 | 16· | 61· | 68· | 131· | 75· | 41· | NW | 0 | S | ·52 | K | 4· | K | 7· | 59 | 83 | ·07 |
| 8 | 29·538 | 29·551 | 17· | 63· | 70· | 125· | 75· | 42· | N | ·52 | W | 2·60 | K | 7· | K | 6· | 67 | 44 | ·04 |
| 9 | 29·541 | 29·621 | 13· | 56· | 62· | 106· | 71· | 39· | W | 6·54 | NE | 5·21 | K | 6· | KN | 10· | 81 | 62 | ·07 |
| 10 | 29·744 | 29·744 | 15· | 59· | 71· | 125· | 74· | 40· | N | 2·60 | S | ·52 | K | 6· | K | 3· | 58 | 84 | ·01 |
| 11 | 29·345 | 29·117 | 14· | 58· | 59· | 72· | 72· | 39· | W | 0 | E | 0 | KN | 10· | KN | 10· | 82 | 88 | |
| 12 | 29·343 | 29·393 | 10· | 50· | 61· | 105· | 64· | 35· | N | ·52 | NW | 5·21 | KN | 10· | K | 7· | 69 | 66 | 1·20 |
| 13 | 29·625 | 29·710 | 13· | 56· | 58· | 110· | 65· | 39· | N | ·52 | S | ·26 | K | 7· | K | 10· | 70 | 76 | ·02 |
| 14 | 29·795 | 29·835 | 13· | 56· | 51· | 90· | 58· | 39· | N | 0 | SE | ·52 | K | 8· | KN | 9· | 81 | 80 | ·1 |
| 15 | 29·942 | 29·954 | 12· | 54· | 57· | 110· | 62· | 40· | SE | ·52 | S | ·52 | K | 7· | K | 7· | 65 | 81 | ·1 |
| 16 | 29·963 | 29·782 | 13· | 56· | 67· | 90· | 69· | 41· | NE | 0 | NW | ·52 | K | 10· | K | 10· | 87 | 60 | ·01 |
| 17 | 29·442 | 29·641 | 9· | 48· | 59· | 95· | 67· | 34· | SW | 15·21 | SW | ·52 | KN | 10· | K | 6· | 93 | 66 | 1·2 |
| 18 | 29·743 | 29·528 | 12· | 54· | 60· | 115· | 66· | 40· | S | 2·60 | S | ·52 | K | 4· | K | 7· | 65 | 72 | ·02 |
| 19 | 29·081 | 29·602 | 13· | 56· | 56· | 108· | 70· | 41· | NE | ·52 | S | 0 | K | 10· | KN | 10· | 72 | 81 | ·0 |
| 20 | 29·633 | 29·634 | 12· | 54· | 59· | 111· | 62· | 43· | NE | 0 | S | ·52 | K | 8· | K | 4· | 75 | 81 | ·4 |
| 21 | 29·691 | 29·572 | 10· | 50· | 59· | 95· | 64· | 40· | N | ·52 | SE | 0 | K | 7· | KN | 10· | 86 | 82 | |
| 22 | 29·472 | 29·542 | 13· | 56· | 55· | 98· | 58· | 41· | SW | ·26 | S | 0 | KN | 10· | KN | 10· | 66 | 77 | ·0 |
| 23 | 29·702 | 29·774 | 11· | 52· | 60· | 112· | 64· | 39· | W | 0 | SW | ·52 | K | 10· | K | 8· | 80 | 81 | ·4 |
| 24 | 29·785 | 29·785 | 12· | 54· | 54· | 120· | 59· | 41· | S | 0 | SE | ·52 | K | 3· | K | 7· | 75 | 67 | |
| 25 | 29·488 | 29·478 | 12· | 54· | 55· | 80· | 64· | 41· | SW | ·52 | S | ·26 | K | 10· | KN | 10· | 81 | 93 | ·0 |
| 26 | 29·427 | 29·228 | 14· | 58· | 55· | 94· | 63· | 43· | NE | ·52 | S | ·26 | K | 6· | N | 10. | 76 | 94 | ·4 |
| 27 | 29·343 | 29·427 | 9· | 48· | 55· | 84· | 65· | 38· | NW | ·26 | SW | ·52 | KN | 10· | KN | 10· | 73 | 87 | 1·3 |
| 28 | 29·838 | 29·875 | 13· | 56· | 57· | 105· | 64· | 40· | S | 0 | S | ·26 | K | 9· | KN | 10· | 81 | 81 | ·1 |
| 29 | 29·842 | 29·681 | 10· | 50· | 65· | 108· | 71· | 38· | NE | 0 | NE | 0 | N | 10· | K | 7· | ·93 | 88 | ·0 |
| 30 | 29·681 | 29·678 | 15· | 60· | 68· | 112· | 71· | 40· | NW | ·52 | NW | ·26 | K | 10· | K | 8· | 62 | 63 | ·01 |
| | Mean Press.<br>29·659 | | Mean<br>12·70 | M'n. Tem.<br>57·90 | | Mean.<br>106·10 | Mean<br>67·0 | Mean<br>39·66 | Mean Force<br>1·04 lb. | | | | Mean for Month.<br>8·13 | | | | Mean<br>74 | | Tl.<br>5·76 |
| | Greatest do.<br>29·963 | | Max.<br>17·00 | | | Max.<br>131·00 | Max.<br>75·0 | Max.<br>44·00 | Greatest Force<br>15·21 lb. | | | | Prev. Character,<br>K | | | | | | |
| | Least do.,<br>29·117 | | Min.<br>9·00 | | | Min.<br>72·00 | Min.<br>58·0 | Min.<br>34·00 | Least Force.<br>0 | | | | | | | | | | |

Of the 30 observations on atmospheric electricity, there were 18 positive and 7 negative indications, with 3 nils; the total force being 770.

The mean is in all cases taken from the sums of the two daily registers, not from the maximum and minimum.

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force
square foot.

The relative quantity of rain that fell under
winds is registered each morning at 7·30 a.m.

FRANCIS ABBOTT, F.R.

# *METEOROLOGY FOR DECEMBER, 1879.*

## PRIVATE OBSERVATORY, HOBART TOWN.

**Latitude 42° 52′ 13″ S.; Longitude 9h. 49m. 29·2s. E.**
**(Registered for the Royal Society of Tasmania.)**

### BAROMETER AND THERMOMETER.

| Day of Month. | Bar. corrected for temperature instrumental error, and to mean sea level. 7·30 a.m. | Bar. 4·30 p.m. | Thermometers (Reading.) Centigrade, 7·30 a.m. | Fahrenheit, 7·30 a.m. | Fahrenheit, 4·30 p.m. | Thermometers (Self-Registering.) Highest in Sun, 4·30 p.m. | Highest in Shade, 4·30 p.m. | Lowest on Grass, 7·30 a.m. | Wind. 7·30 a.m. Direction from. | Force in lbs. per square foot. | Wind. 4·30 p.m. Direction from. | Force in lbs. per square foot. | Clouds. 7·30 a.m. Character. | Amount. | Clouds. 4·30 p.m. Character. | Amount. | Relative Humidity. Per cent 7·30 a.m. | 4·30 p.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 29·425 | 29·518 | 16· | 61· | 62· | 110· | 72· | 40· | S | 0 | SW | 0 | KN | 10· | K | 7· | 87 | 62 |
| 2 | 29·648 | 29·749 | 15· | 59· | 65· | 115· | 68· | 39· | NW | ·26 | NW | ·62 | K | 7· | K | 7· | 82 | 88 |
| 3 | 29·678 | 29·468 | 15· | 59· | 65· | 116· | 69· | 39· | N | 0 | NW | 2·60 | K | 10· | K | 6· | 71 | 56 |
| 4 | 29·624 | 29·692 | 11· | 58· | 57· | 110· | 63· | 40· | N | 0 | S | 0 | K | 7· | N | 10· | 71 | 93 |
| 5 | 29·789 | 29·693 | 11· | 52· | 52· | 75· | 61· | 40· | NE | 0 | S | ·52 | N | 10· | KN | 10· | 83 | 81 |
| 6 | 29·706 | 29·771 | 15· | 59· | 67· | 117· | 69· | 41· | NE | 0 | S | ·52 | K | 7· | K | 7· | 76 | 79 |
| 7 | 29·525 | 29·217 | 14· | 58· | 59· | 87· | 71· | 43· | SW | 0 | NE | 0 | K | 10· | K | 10· | 71 | 87 |
| 8 | 29·133 | 29·367 | 13· | 56· | 63· | 125· | 70· | 40· | S | ·52 | S | 5·21 | KN | 10· | K | 8· | 87 | 68 |
| 9 | 29·715 | 29·721 | 18· | 64· | 69· | 116· | 72· | 41· | S | ·52 | S | ·52 | K | 5· | K | 4· | 94 | 77 |
| 10 | 29·729 | 29·668 | 13· | 56· | 64· | 110· | 68· | 37· | NE | 0 | SW | ·52 | KN | 10· | KN | 10· | 87 | 82 |
| 11 | 29·823 | 29·895 | 14· | 58· | 62· | 110· | 67· | 39· | S | ·52 | SW | ·52 | K | 7· | K | 5· | 71 | 72 |
| 12 | 29·983 | 30·041 | 14· | 58· | 62· | 110· | 68· | 38· | SW | ·52 | S | ·52 | K | 7· | K | 4· | 76 | 72 |
| 13 | 30·028 | 29·987 | 13· | 57· | 64· | 110· | 70· | 39· | NE | 0 | SE | ·52 | KN | 10· | K | 7· | 71 | 72 |
| 14 | 29·894 | 29·667 | 13· | 56· | 69· | 115· | 72· | 40· | N | ·26 | S | ·52 | K | 5· | K | 7· | 70 | 73 |
| 15 | 29·792 | 29·875 | 17· | 63· | 66· | 118· | 73· | 41· | SE | ·26 | S | ·26 | K | 4· | K | 3· | 68 | 60 |
| 16 | 29·981 | 29·941 | 15· | 59· | 68· | 125· | 76· | 40· | N | ·26 | S | ·26 | K | 10· | K | 7· | 82 | 73 |
| 17 | 30·015 | 29·758 | 20· | 68· | 77· | 125· | 82· | 43· | N | ·52 | S | ·26 | K | 7· | K | 10· | 88 | 63 |
| 13 | 29·717 | 29·549 | 21· | 70· | 60· | 110· | 75· | 44· | NW | 0 | SW | 2·60 | K | 8· | K | 10· | 69 | 88 |
| 19 | 29·525 | 29·650 | 12· | 54· | 62· | 120· | 70· | 43· | SW | ·52 | W | 2·60 | N | 10· | K | 7· | 76 | 88 |
| 20 | 29·425 | 29·498 | 14· | 58· | 61· | 121· | 69· | 43· | W | 2·60 | W | 2·60 | K | 6· | KN | 10· | 71 | 59 |
| 21 | 29·525 | 29·424 | 13· | 56· | 57· | 110· | 64· | 42· | SW | 2·60 | SW | ·52 | K | 10· | KN | 7· | 81 | 75 |
| 22 | 29·661 | 29·672 | 11· | 52· | 53· | 110· | 62· | 41· | NW | ·52 | W | ·26 | KN | 9· | KN | 9· | 69 | 70 |
| 23 | 29·935 | 29·948 | 13· | 56· | 61· | 125· | 64· | 42· | NW | ·52 | SW | 2·60 | K | 5· | K | 4· | 70 | 63 |
| 24 | 29·904 | 29·975 | 12· | 54· | 61· | 110· | 65· | 41· | N | ·52 | SW | 5·21 | K | 8· | K | 7· | 80 | 67 |
| 25 | 29·942 | 29·831 | 17· | 63· | 68· | 125· | 71· | 43· | N | 2·60 | S | ·52 | K | 10· | K | 4· | 63 | 68 |
| 26 | 29·667 | 29·621 | 17· | 63· | 73· | 125· | 77· | 43· | NW | ·26 | S | 2·60 | K | 4· | K | 3· | 72 | 69 |
| 27 | 29·391 | 29·133 | 16· | 61· | 73· | 89· | 73· | 41· | S | 0 | NW | ·26 | N | 10· | K | 10. | 94 | 83 |
| 28 | 29·345 | 29·441 | 12· | 54· | 60· | 122· | 71· | 40· | SW | 2·60 | SW | 2·60 | K | 10· | K | 8· | 81 | 62 |
| 29 | 29·877 | 29·932 | 15·5 | 60· | 70· | 1·0· | 76· | 42· | NW | ·26 | S | 0 | K | 10· | K | 9· | 67 | 73 |
| 30 | 29·941 | 29·948 | 17· | 62· | 71· | 130· | 75· | 41· | SE | ·26 | W | ·52 | K | 8· | K | 7. | 77 | 62 |
| 31 | 30·065 | 30·078 | 18·5 | 65· | 67· | 130· | 75· | 42· | NW | ·26 | S | ·52 | K | 6· | K | 7· | 64 | 68 |

| Bar. | Centigrade | Fahrenheit | Highest in Sun | Highest in Shade | Lowest on Grass | Wind | Clouds | Relative Humidity | |
|---|---|---|---|---|---|---|---|---|---|
| Mean Press. 29·712 | Mean 14·71 | M'n. Tem. 61·56 | Mean. 114·23 | Mean 70·30 | Mean 40·30 | Mean Force ·83 lb. | Mean for Month. 8· | Mean 75 | Tl. 1· |
| Greatest do. 30·078 | Max. 21·00 | | Max. 130·00 | Max. 82·00 | Max. 44·00 | Greatest Force 5·21 lb. | Prev. Character, K | | |
| Least do., 29·133 | Min. 11·00 | | Min. 75·00 | Min. 61·00 | Min. 38·00 | Least Force. 0 | | | |

Of the 31 observations on atmospheric electricity, there were 4 positive and 21 negative indications, with 6 nils; the total force being 907.

The mean is in all cases taken from the sums of the two daily registers, not from the maximum and minimum.

The direction of the wind is registered from currents at a height of 92 feet above sea level, and its f square foot.

The relative quantity of rain that fell und winds is registered each morning at 7·30 a.m.

FRANCIS ABBOTT, 1

Results of observations taken at New Norfolk in April, May, and June, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

### APRIL.

Barometer.—Mean of two daily readings, corrected and reduced, 30·125 inches.

Thermometer.—Mean of two ditto, 51·74 deg.
,, Mean of max. and min. in shade, 54·55deg.

Dew Point.—Mean position of two ditto, 44·30 deg.

Elastic Force of Vapour.—Mean of two ditto, ·293.

Humidity of Air.—Mean of two ditto, ·78.

Solar Intensity.—Mean of max. temperature, 123·83 deg.

Terrestrial Radiation.—Mean of min temperature, 35·51 deg.

Daily range of temperature in shade, 24·48 deg.

Rainfall —·71 inches; total this year, 4·66 inches; ditto to same time in '78, 5·83 inches; ditto, '77, 5·28 inches; ditto '76, 5·02 inches; ditto, '75 6·00 inches; ditto '74, 5 32 inches.

Evaporation.—1·94 inches, in excess of rainfall, 1·23 inches.

Clouds.—Mean amount of two daily registers ,5·31. Scale 0·10

Ozone.—Mean amount of two ditto, 6·50. Scale 0·10.

### MAY.

Barometer.—Mean of two daily readings, connected and reduced, 30·030 inches.

Thermometer.—Mean of two ditto, 46·82 deg.
,, Mean of max. and min. in shade, 48·01 deg.
,, Daily range mean of two ditto, 17·32 deg.

Dew Point.—Mean position of two ditto, 42·56 deg.

Elastic Force of Vapour.—Mean of two ditto, ·273.

Humidity of Air.—Mean of two ditto, ·86

Solar Intensity.—Mean of max. temperature, 105·80 deg.

Terrestrial Radiation.—Mean of min. temperature, 33·22 deg.

Rainfall.—81 inch; total this year, 5·47 inches; ditto, to same time, in '78, 7·70 inches; in '77, 6·88 inches; in '76, 5·84 inches; in '75, 8·48 inches; in '74, 7·12 inches,

Evaporation.—·91 inch, in excess of rainfall, ·10 inch.

Clouds.—Mean amount of two ditto, 6·70. Scale 0·10.

Ozone.—Mean of two ditto, 6·66. Scale 0·10.

### JUNE.

Barometer.—Mean of two daily readings, corrected and reduced, 30·050 inches.

Thermometer.—Mean of two ditto, 40·32 deg.
,, Mean of max. and min. in shade, 42·00 deg.
,, Highest in shade, 58 deg. on 13th.
,, Lowest in shade, 25 deg. on 6th.

Solar Intensity.—Mean of max. temperature, 98·48 deg.
,, Highest, 112 deg. on 11th.

Terrestrial Radiation.—Mean of min. temperature, 28·70 deg.
,, ,, Lowest, 21 deg. on 6th.

Dew Point.—Mean of two daily registers, 36·53 deg.

Elastic Force of Vapour.—Mean of two ditto, ·216.

Humidity.—Mean of two ditto, ·86.

Rainfall.—2·23 inches; total this year, 7·70 inches; to same time in '78, 9·40 inches; in '77, 9·34 inches; in '76, 8·23 inches; in '75, 10·05 inches; in '74, 8·92 inches.

Evaporation.—·75 inch.

Clouds.—Mean amount of two ditto, 6·10. Scale 0·10.

Ozone.—Mean amount of two ditto, 5·70. Scale 0·10.

W. E. SHOOBRIDGE, Bushy Park.

## *METEOROLOGICAL.*

Results of observations taken at New Norfolk in June and July, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

### JUNE.

Barometer.—Mean of two daily readings, corrected and reduced, 30·050 inches.

Thermometer.—Mean of two ditto, 40·32deg.

,, Mean of max. and min. in shade, 42·00deg.

,, Highest in shade, 58deg. on 13th.

,, Lowest in shade, 25deg. on 6th.

Solar Intensity.—Mean of max. temperature, 98·48deg.

,, Highest, 112deg. on 11th.

Terrestrial Radiation.—Mean of min. temperature, 28·70deg.

,, Lowest, 21deg. on 6th.

Dew Point.—Mean of two daily registers, 36·53deg.

Elastic Force of Vapour.—Mean of two ditto, ·216.

Humidity.—Mean of two ditto, ·86.

Rainfall.—2·23 inches; total this year, 7·70 inches; to same time in 1878, 9·40in.; 1877, 9·34in.; 1876, 8·23in.; 1875, 10·5in.; 1874, 8·92in.

Evaporation.—·75inch.

Clouds.—Mean amount of two ditto, 6·10. Scale 0·10.

Ozone.—Mean amount of two ditto, 5·70. Scale 0·10.

### JULY.

Barometer.—Mean of two daily readings, corrected and reduced, 30·063 inches.

,, Highest, 30·50, on 13th.

,, Lowest, 29·33, on 6th.

Thermometer.—Mean of two ditto, 39·37deg.

,, Mean of max. and min. in shade, 41·17deg.

,, Highest in shade, 58deg. on 18th.

,, Lowest in shade, 24deg. on 26th.

Humidity of Air.—Mean of two ditto, ·87

Elastic Force of Vapour.—Mean of two ditto, ·207.

Dew Point.—Mean position of two ditto, 35·38deg.

Solar Intensity.—Mean of max. temperature, 98·00deg.

,, Highest, 117deg. on 22nd.

,, Lowest, 54deg. on 3rd.

Terrestrial Radiation.—Mean of min. temperature, 26·38deg.

,, Highest, 36deg. on 15th.

,, Lowest, 18deg. on 26th.

Rainfall —·73 inches; total this year, 8·43 inches; ditto to same time in '78, 11·34 inches; in '77, 10·61 inches; in '76, 9·37 inches; in '75, 11·53 inches; and in '74, 10·69 inches.

Evaporation.—·73 inch, same as rainfall.

Clouds.—Mean amount of two daily registers, 5·79. Scale 0·10.

Ozone.—Mean amount of two ditto, 5·45. Scale 0·10.

W. E. SHOOBRIDGE, Bushy Park.

## *METEOROLOGICAL.*

Results of observations taken at New Norfolk for August, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 30·079 inches.
,, Highest, 30·56, on 6th.
,, Lowest, 29·23, on 17th.
Thermometer.—Mean of two ditto, 44·26deg.
,, Mean of max. and min. in shade, 46·04deg.
,, Highest, 66deg. on 28th.
,, Lowest, 26deg. on 6th.
Dew Point.—Mean position of two ditto, 38·62deg.
Humidity of Air.—Mean of two ditto, ·79
Elastic Force of Vapour.—Mean of two ditto, ·236.
Solar Intensity.—Mean of max. temperature, 110·61deg.
,, Highest, 126deg. on 24th.
,, Lowest, 54deg. on 3rd.
Terrestrial Radiation.—Mean of min. temperature, 30·45deg.
,, Highest, 43deg. on 30th.
,, Lowest, 20deg. on 6th.

Rainfall.—To 16th, 1·38 inches; to end of month, ·03; total, 1·41 inches. Total this year, 9·84 inches; ditto to same time in 1878, 15·23 inches; in 1877, 14·97 inches; in 1876, 12·04 inches; in 1875, 13·46 inches; and in 1874, 12·48 inches.

Evaporation.—1·97 inches, in excess of rainfall ·56 inch.

Clouds.—Mean amount of two daily registers, 6·09. Scale 0·10.

Ozone.—Mean of two ditto to 16th, 7·80; to 31st, 4·42; ditto mean for month, 6·12.

W. E. SHOOBRIDGE, Bushy Park.

## *METEOROLOGICAL.*

Results of observations taken at New Norfolk, Tasmania, for September, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·977 inches.
Thermometer.—Mean of two ditto, 50·65deg.
,, Mean of max. and min. in shade, 51·38deg.
,, Highest in shade, 71deg. on 8th.
,, Lowest, do., 33deg. on 20th and 29th.
Dew Point.—Mean position of two ditto, 41·54deg.
Elastic Force of Vapour.—Mean of two ditto, ·263.
Humidity of Air.—Mean of two ditto, ·71.
Solar Intensity.—Mean of max. temperature, 119·36deg.
,, Highest, 133deg. on 17th.
Terrestrial Radiation.—Mean of min. temperature, 33·63deg.
,, Lowest, 26deg. on 20th.

Rainfall.—1·35 inches; do., September, 1878, 3·16 inches; do. Setember, 1877, ·50 inches. Total this year, 11·19 inches; do. to same time in 1878, 18·39 inches; to same in 1877, 15·47 inches; in 1876, 14·81 inches; in 1875, 15·83 inches; in 1874, 14·91 inches.

Evaporation.—3·17 inches, in excess of rainfall 1·82 inches.
Clouds.—Mean of two daily registers, 5·96. Scale 0·10.
Ozone.—Mean of two do., 4·70. Scale 0·10.

W. E. Shoobridge, Bushy Park.

## *METEOROLOGICAL.*

Results of observations taken at New Norfolk, Tasmania, for October, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·894 inches.
,, Highest, 30·34 in. on 25th.
,, Lowest, 29·42 in. on 22nd.
Thermometer.—Mean of two ditto, 54·30deg.
,, Mean of max. and min. in shade, 53·50deg.
,, Highest in shade, 82deg. on 16th.
,, Lowest, do., 30deg. on 14th.
Dew Point.—Mean position of two ditto, 43·34deg.
Humidity of Air.—Mean of two ditto, ·66.
Elastic Force of Vapour.—Mean of two ditto, ·280.
Solar Intensity.—Mean of max. temperature, 124·03deg.
,, Highest, 141deg. on 16th.
,, Lowest, 84deg. on 6th.
Terrestrial Radiation.—Mean of min. temperature, 33·51deg.
,, Highest, 48deg. on 19th.
,, Lowest, 24deg. on 14th.
Daily range of temperature in shade—Mean, 26·93 deg.

Rainfall.—Total, 1·45 inches; total this year, 12·64 inches; do. to same time in 1878, 21·21 inches; in 1877, 18·22 inches; in 1876, 16·97 inches; in 1875, 19·03 inches; in 1874, 16·29 inches.

Evaporation.—4·51 inches, in excess of rainfall 3·06 inches.
Clouds.—Mean amount of two ditto, 5·70. Scale 0·10.
Ozone.—Mean of two do., 4·83. Scale 0·10.

W. E. Shoobridge, Bushy Park.

## *METEOROLOGICAL.*

Results of observations taken at New Norfolk, Tasmania, for November, 1879, in accordance with new forms, at 7·30 a.m. and 4·30 p.m.:—

Barometer.—Mean of two daily readings, corrected and reduced, 29·762 inches.
Thermometer.—Mean of two ditto, 56·05deg.
,, Mean of max. and min. in shade, 56·50deg.
,, Highest, 75deg. on 1st.
,, Lowest, do., 36deg. on 15th.
Mean of daily range in shade, 20·60deg.
Dew Point.—Mean position of two ditto, 47·76deg.
Elastic Force of Vapour.—Mean of two ditto, ·328.
Humidity of Air.—Mean of two ditto, ·73.
Solar Intensity.—Mean of max. temperature, 126·73deg.
,, Highest, 143deg. on 23rd.
,, Lowest, 78deg. on 11th.
Terrestrial Radiation.—Mean of min. temperature, 39·36deg.
,, Highest, 46deg. on 8th and 29th.
,, Lowest, 29deg. on 15th.

Rainfall.—5·05 inches; total this year, 17·69 inches; total to same time in 1878, 24·87 inches; do. in 1877, 21·14 inches; in 1876, 21·49 inches; in 1875, 22·26 inches; and in 1874, 21·64 inches.

Evaporation.—4·16 inches; less than rainfall, ·89 inch.

Clouds.—Mean amount of two daily registers, 6·53. Scale, 0·10.

Ozone.—Mean do. of two do., 5·73. Scale 0·10.

W. E. SHOOBRIDGE, Bushy Park.

## METEOROLOGICAL OBSERVATIONS.

### FROM 1ST TO 15TH JANUARY 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

**Lat. 42 32′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| Day of Month. | Barometer corrected for Temp. Index Error and to Mean Sea Level. | Thermometers. | | Relative Humidity. | Wind. | | Cloud. | | Rain in 24 hours. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fahrenheit. | Centigrade. | | Direction from | Force in lbs. per square foot. | Amount. | Character. | | |
| | | | | p. c. | | | | | In. | |
| 1 | 29·621 | 57·0 | 9·0 | 88 | S | .26 | 4 | K | | Moon and Stars |
| 2 | 29·872 | 60·0 | 15·0 | 69 | NW | ·62 | 10 | KN | | Moon and Clouds |
| 3 | 29·920 | 61·0 | 16·0 | 88 | W | ·52 | ·0 | ·0 | ·02 | Moon and Starlight |
| 4 | 29·545 | 77.0 | 25·0 | 89 | N | ·0 | ·6 | K | | Moon, Cloud and Stars |
| 5 | 30·058 | 68·0 | 20·0 | 89 | ·0 | ·0 | ·10 | K | | Calm and Cloudy |
| 6 | 29·945 | 66·0 | 19·0 | 84 | S | ·26 | ·0 | ·0 | | Clear Moon |
| 7 | 29·710 | 66·0 | 19·0 | 89 | SE | ·26 | ·10 | KN | | Thunder and Lightning |
| 8 | 29·725 | 61 0 | 16.0 | 83 | S | ·26 | ·10 | K | ·12 | Cloud, sky covered |
| 9 | 29·720 | 60·0 | 15·5 | 83 | S | ·26 | ·9 | K | ·01 | Moonlight |
| 10 | 29.825 | 59·0 | 15·0 | 88 | SW | ·26 | 3 | K | | Moon and Starlight |
| 11 | 29·725 | 57·0 | 14·0 | 94 | SW | ·52 | 5 | K | | Moon and Cloud |
| 12 | 29·910 | 53·0 | 11·0 | 94 | SW | ·52 | 10 | KN | ·02 | Cloud, sky covered |
| 13 | 29·945 | 57·0 | 14·0 | 94 | SE | ·52 | 10 | KN | ·03 | Cloud, sky covered |
| 14 | 29·965 | 60·0 | 15 5 | 88 | SE | ·26 | 4 | K | ·01 | Starlight |
| 15 | 29·710 | 72·0 | 22·0 | 100 | SW | ·52 | 7 | K | | Cloud, sky covered |

**FRANCIS ABBOTT, F.R.A.S.**, etc. Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# METEOROLOGICAL OBSERVATIONS.

## FROM 15TH TO 31ST JANUARY, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| Day of Month. | Barometer corrected for Temp. Index Error and to Mean Sea Level. | Thermometers. Fahrenheit. | Thermometers. Centigrade. | Relative Humidity. | Wind. Direction from | Wind. Force in lbs. per square foot. | Cloud. Amount. | Cloud. Character. | Rain in 24 hours. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | p. c. | | | | | In. | |
| 16 | 29·950 | 59· | 15· | 88 | S | 52 | ·10 | N | | Cloud, sky covered |
| 17 | 29·820 | 62· | 17· | 88 | SE | .26 | 10 | KN | | Cloud, sky covered |
| 18 | 30·120 | 56· | 13· | 83 | NW | 2·60 | ·0 | ·0 | | Starlight |
| 19 | 30·120 | 55· | 13· | 88 | NW | ·0 | 4 | K | | Starlight |
| 20 | 29·825 | 61· | 16. | 76 | E | ·52 | ·0 | ·0 | | Starlight |
| 21 | 29·640 | 69· | 20· | 89 | N | ·26 | 10 | KN | | Sky cloudy, Lightning |
| 22 | 29·950 | 61· | 16· | 88 | SE | ·52 | 7 | K | | Stars in Zenith |
| 23 | 29·826 | 68· | 20· | 79 | SE | ·26 | 10 | KN | | Cloud, sky covered |
| 24 | 29·610 | 64· | 18· | 79 | S | ·26 | 10 | KN | ·02 | Sky cloudy |
| 25 | 29.820 | 57· | 13· | 83 | NW | ·52 | 10 | K | ·55 | Sky Cloudy |
| 26 | 30·025 | 56· | 13·5 | 88 | S | ·26 | ·0 | ·0 | ·02 | Starlight |
| 27 | 29·985 | 61· | 16· | 88 | S | ·52 | 10 | K | | Cloud, sky covered |
| 28 | 29·756 | 68· | 20· | 88 | SE | ·26 | ·0 | ·0 | | Stars in the Zenith |
| 29 | 29·820 | 62· | 17· | 78 | S | ·52 | 10 | K | | Cloud, sky covered |
| 30 | 29·700 | 66· | 19· | 89 | SE | ·26 | 0 | 0 | | Starlight |
| 31 | 29·942 | 62· | 17· | 68 | SE | 52 | .0 | ·0 | | Moon and Starlight |

**FRANCIS ABBOTT, F.R.A.S.**, etc. Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## From 1st to 15th February, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p. c.* | | | | | *In.* | |
| 1 | 29·940 | 55· | 13· | 78 | S | .26 | 4 | K | | Stars Faint |
| 2 | 29·945 | 63· | 17·5 | 78 | N | .26 | 10 | K | | Calm and Cloudy |
| 3 | 29·345 | 62· | 17· | 78 | SE | ·26 | 10 | K | | Moon Overcast. |
| 4 | 29·740 | 64· | 18· | 83 | NW | ·26 | 10 | K | | Cloudy, Sultry |
| 5 | 29·820 | 64· | 18. | 74 | SW | ·26 | 10 | K | | Moon Overcast |
| 6 | 29·910 | 64· | 18· | 78 | SE | ·26 | 10 | K | | Hazy, Moon Red |
| 7 | 29·945 | 63· | 17·5 | 78 | SE | ·26 | 10 | KN | | Cloud, sky covered |
| 8 | 29·920 | 60· | 15·5 | 78 | S | ·26 | 4 | K | ·02 | Moonlight |
| 9 | 30·142 | 57· | 14· | 78 | SE | ·52 | ·0 | ·0 | | Moon, Sky Hazy |
| 10 | 29.519 | 76· | 23·5 | 74 | ·0 | ·0 | 10 | K | | Calm and Cloudy |
| 11 | 29·920 | 67· | 19·0 | 73 | W | ·26 | 10 | K | | Cloud, sky covered |
| 12 | 29·970 | 64· | 18· | 78 | ·0 | ·0 | 9 | K | ·25 | Calm and Cloudy |
| 13 | 29·740 | 68· | 20· | 78 | .0 | ·0 | 10 | K | | Calm and Cloudy |
| 14 | 29·920 | 58· | 14·5 | 70 | S | ·26 | 4 | K | | Starlight |
| 15 | 30·045 | 58· | 14 5 | 83 | S | ·26 | 12 | K | ·01 | Cloud, sky covered |

**Francis Abbott, F.R.A.S., etc., Observer.**

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 16TH TO 28TH FEBRUARY, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

### Private Observatory Hobart Town.

**Lat. 42 32′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | p. c. | | | | | In. | |
| 16 | 30.110 | 56·0 | 13·0 | 83 | NE | .26 | K | 4 | ·02 | Starlight |
| 17 | 30·072 | 61·0 | 16·0 | 83 | SE | .52 | K | 8 | | Sky Cloudy |
| 18 | 29·340 | 61·16 | 16·0 | 73 | SE | ·26 | K | 7 | | Sky Cloudy |
| 19 | 29·525 | 59·0 | 15·0 | 73 | W | ·26 | K | 5 | | Starlight |
| 20 | 29·120 | 59 0 | 15.0 | 73 | NW | 5·21 | KN | 10 | | Squally |
| 21 | 29·220 | 57·0 | 14·0 | 77 | SW | 2·60 | KN | 4 | ·09 | Squally |
| 22 | 29 510 | 52·0 | 12·0 | 76 | SW | ·62 | K | 4 | ·04 | Starlight |
| 23 | 29·975 | 50 0 | 10·0 | 76 | W | ·52 | ·0 | ·0 | ·01 | Starlight |
| 24 | 29·930 | 57 0 | 14·0 | 88 | S | ·52 | ·0 | ·04 | | Stars Hazy |
| 25 | 29.720 | 56·0 | 14·0 | 78 | S | ·26 | K | .0 | ·11 | Starlight |
| 26 | 29·412 | 68·0 | 20·1 | 88 | NW | ·26 | Nim | ·0 | ·1 | Light rain |
| 27 | 29·615 | 56·0 | 13·0 | 77 | NW | ·26 | K | 11 | | Star and Clouds |
| 28 | 29·605 | 62·0 | 17·0 | 83 | NW | ·26 | KN | ·01 | ·1 | Stars Faint |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

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# METEOROLOGICAL OBSERVATIONS.

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## *METEOROLOGICAL OBSERVATIONS.*

### FROM 1ST TO THE 15TH MARCH, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29.975 | 53·0 | 11·5 | 88 | NW | .52 | K | 7 | | Star and Clouds |
| 2 | 30·050 | 57·0 | 14·0 | 82 | S | .25 | K | 10 | | Sky Cloudy |
| 3 | 29·979 | 56·0 | 13·0 | 83 | S | ·52 | K | 10 | | Sky Cloudy |
| 4 | 29·910 | 58·0 | 15·0 | 78 | NE | ·52 | KS | 4 | | Moon and Stars |
| 5 | 29·748 | 65 0 | 18·0 | 77 | SE | ·52 | K | 9 | | Moon and Clouds |
| 6 | 29·741 | 57·0 | 14·0 | 74 | SW | ·26 | ·0 | ·0 | | Moon and Stars |
| 7 | 29·920 | 59·0 | 15·0 | 83 | S | ·26 | K | 7 | ·15 | Moon and Starlight |
| 8 | 29·910 | 58 0 | 14·5 | 88 | NW | ·26 | K | 4 | ·01 | Moonlight |
| 9 | 29·965 | 59·0 | 15·0 | 78 | NW | ·0 | ·0 | ·0 | ·11 | Clear Moonlight. |
| 10 | 29.987 | 68·0 | 20·0 | 83 | W | ·52 | K | 7 | | Moon and Cloud |
| 11 | 30·045 | 60·0 | 16·0 | 83 | SE | ·26 | K | 10 | ·04 | Cloud Sky Covered |
| 12 | 30·045 | 60·0 | 16·0 | 84 | NE | ·26 | K | 10 | ·01 | Cloud Sky Covered |
| 13 | 29·765 | 59·0 | 15·0 | 100 | S | ·0 | KN | 10 | | Rain thro' night |
| 14 | 29.320 | 62·0 | 16·5 | 94 | SW | ·25 | KN | 10 | 1·55 | Cloud and rain |
| 15 | 29·820 | 53·0 | 12·0 | 94 | N | ·52 | K | 4 | ·10 | Faint Starlight. |

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

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## *METEOROLOGICAL OBSERVATIONS.*

### FROM 16TH TO THE 31ST MARCH, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

**Private Observatory, Hobart Town.**

**Lat. 42 52′ 13″ S.** **Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| ***Day of Month.*** | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | ***Weather.*** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 29.920 | 52·0 | 11·0 | 82 | N | .52 | KN | 10 | ·01 | Sky Cloudy |
| 17 | 29·97 | 52·0 | 11·0 | 100 | SE | ·0 | N | 10 | | Cloud Sky Covered |
| 18 | 29·975 | 53·0 | 12·0 | 82 | S | ·0 | KN | 10 | .04 | Cloud Sky Covered |
| 19 | 30·145 | 53·0 | 11·0 | 82 | NW | ·26 | ·0 | ·0 | ·02 | Starlight |
| 20 | 29·972 | 62·0 | 16·5 | 88 | N | ·26 | ·0 | ·0 | | Starlight |
| 21 | 30·210 | 63·5 | 17·5 | 88 | S | ·26 | KN | 10 | | Cloud Sky Covered |
| 22 | 30·125 | 63·0 | 17·0 | 88 | SE | ·26 | K | 10 | | Cloud Sky Covered |
| 23 | 30.125 | 58·0 | 14·0 | 83 | SE | ·0 | K | 10 | ·02 | Cloud Sky Covered |
| 24 | 29·645 | 61·0 | 16·0 | 88 | NW | ·0 | KN | 10 | | Calm and Cloudy |
| 25 | 29.745 | 58·0 | 14·5 | 88 | NW | ·0 | ·0 | ·0 | 10 | Calm and Starlight |
| 26 | 30·225 | 51·0 | 10·5 | 88 | S | ·52 | 10 | KN | | Cloud Sky Covered |
| 27 | 30·045 | 55·0 | 13·0 | 82 | E | ·26 | 10 | KN | | Sky Cloudy |
| 23 | 29·625 | 58·0 | 14·5 | 88 | NW | ·26 | 9 | K | 4 | Sky Cloudy |
| 29 | 29.620 | 51·0 | 10·5 | 76 | SW | 5·21 | ·0 | 0· | ·02 | Starlight, Strong Wind |
| 30 | 30·045 | 46·0 | 8·0 | 77 | E | ·26 | 4 | K | .01 | Moon and Starlight |
| 31 | 29·845 | 55·0 | 13·0 | 82 | NW | ·26 | 9 | K | ·01 | Sky Cloudy |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 15TH APRIL, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

### Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* |  | *Relative Humidity.* | *Wind.* |  | *Cloud.* |  | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | *Fahrenheit.* | *Centigrade.* |  | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* |  |  |
|  |  |  |  | *p.c.* |  |  |  |  | *In.* |  |
| 1 | 29.925 | 50·0 | 10·0 | 82 | SE | ·26 | K | 7 |  | Moon and Stars |
| 2 | 29·725 | 57·0 | 14·0 | 88 | E | ·26 | K | 10 |  | Moon and Stars |
| 3 | 30·013 | 48·0 | 9·0 | 88 | S | .52 | ·0 | ·0 | ·20 | Clear Moonlight |
| 4 | 30·310 | 52·0 | 12·0 | 82 | S | ·52 | K | 10 | ·10 | Cloud Sky Covered |
| 5 | 30·066 | 62·0 | 17·0 | 83 | NW | ·26 | K | 10 |  | Moon Full and Cloudy |
| 6 | 29·945 | 68·0 | 20·0 | 83 | SE | ·26 | K | 6 |  | Moonlight |
| 7 | 29·925 | 60·0 | 15·5 | 88 | ·0 | ·0 | K | 10 |  | Calm and hazy |
| 8 | 29·920 | 61·0 | 16·0 | 88 | ·0 | ·0 | K | 10 | ·02 | Calm and Cloudy |
| 9 | 29·914 | 55·0 | 15·0 | 77 | W | ·52 | K | 7 |  | Moon, Star and Cloud |
| 10 | 30·020 | 57·0 | 14·5 | 88 | SE | ·26 | KN | 10 |  | Sky Cloudy |
| 11 | 29·525 | 55·0 | 13·0 | 88 | S | ·26 | K | 10 |  | Sky Cloudy |
| 12 | 30·025 | 43·0 | 6·0 | 87 | S | ·52 | K | 10 |  | Squally |
| 13 | 30.225 | 45·0 | 7·0 | 93 | ·0 | ·0 | KN | 10 | ·95 | Cloud very dark |
| 14 | 30.210 | 54·0 | 12·5 | 82 | SW | ·26 | K | 10 | .21 | Cloud Sky Covered |
| 15 | 30.265 | 57·0 | 14·0 | 83 | NW | ·0 | ·0 | ·0 | ·02 | Starlight |

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## From 16th to the 30th April, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

**Private Observatory, Hobart Town.**

**Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 30·225 | 63 | 17·5 | 73 | SE | ·26 | KS | | ·01 | Fine, cloudy |
| 17 | 30·082 | 72· | 22· | 84 | NW | ·0 | K | | | Fine and clear |
| 18 | 29·902 | 65· | 18· | 55 | SW | ·52 | K | 7 | | Fine |
| 19 | 30·339 | 54· | 12· | 81 | S | ·52 | K | 9 | | Calm and cloudy |
| 20 | 30·363 | 61· | 16 | 72 | S | ·26 | KS | 2 | ·02 | Fine and clear |
| 21 | 30·222 | 60· | 20 | 6[illegible] | N | ·26 | K | 4 | | Ditto |
| 22 | 30·231 | 73· | 22·5 | 54 | NW | ·26 | 0 | 0 | | Clear sky, sultry |
| 23 | 30·191 | 71 | 21 | 54 | N | ·0 | K | 4 | | Clear |
| 24 | 30·038 | 60 | 15· | 88 | NW | ·0 | K | 10 | | Rain |
| 25 | 30·055 | 63· | 17·5 | 72 | SE | ·0 | K | 5 | ·03 | Cloud and haze |
| 26 | 29·918 | 58· | 14·5 | 81 | SW | ·52 | K | 6 | ·01 | Thick and cloudy, light rain |
| 27 | 30·022 | 56· | 13 | 80 | N | ·0 | K | 10 | ·03 | Cloudy |
| 23 | 29·584 | 69· | 20· | 56 | N | 2·60 | K | 10 | | Ditto, strong wind |
| 29 | 29·545 | 53· | 11·5 | 82 | SE | ·52 | KN | 10 | ·40 | Rain |
| 30 | 29·945 | 49· | 9·5 | 93 | SW | ·26 | KN | 7 | | Ditto |

Francis Abbott, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## From 1st to the 16th May, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

### Private Observatory, Hobart Town.

**Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | p.c. | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | In. | |
| 1 | 29·946 | 50·0 | 10·0 | 87 | S | ·25 | KN | 10 | ·04 | Cloud Sky Covered |
| 2 | 29·945 | 46·0 | 8·0 | 81 | S | ·26 | K | 10 | ·07 | Cloud Sky Covered |
| 3 | 30·148 | 43·0 | 6·5 | 81 | S | ·26 | K | 8 | ·01 | Faint Moon |
| 4 | 30·22[illegible] | 48·0 | 9·0 | 93 | S | ·26 | KN | 10 | ·08 | Thick and hazy |
| 5 | 30·125 | 42·0 | 5·5 | 87 | NW | ·26 | K | 7 | ·05 | Moonlight |
| 6 | 30·020 | 40·0 | in 0 | 75 | N | ·26 | K | 2 | ·01 | Moon and Starlight |
| 7 | 29·985 | 47·5 | 8·5 | 81 | NW | ·26 | KN | 10 | | Rain |
| 8 | 30·168 | 53·0 | 12·0 | 83 | NW | ·26 | K | | | Moon and Star |
| 9 | 30·125 | 48·0 | 9·0 | 86 | NW | ·26 | K | 3 | ·01 | Moonlight |
| 10 | 30·025 | 48·0 | 9·0 | 76 | E | ·0 | K | 4 | | Moonlight |
| 11 | 29·875 | 50·0 | 10·0 | 88 | N | ·26 | K | 5 | | Few stars only |
| 12 | 29·948 | 52·0 | 11·0 | 88 | S | ·26 | KN | 10 | | Sky Cloudy |
| 13 | 30.065 | 53·0 | 11·5 | 94 | S | ·26 | K | 9 | ·02 | Sky Cloudy |
| 14 | 30·148 | 50·0 | 10·0 | 93 | S | ·26 | N | 10 | ·04 | Cloud Sky Covered |
| 15 | 30·228 | 50·0 | 10·0 | 94 | S | .26 | KN | 10 | ·09 | Small Rain |
| 16 | 30·268 | 50·0 | 10·0 | 94 | S | ·0 | KN | 10 | ·12 | Cloud Sky Covered |

**Francis Abbott, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 17TH TO THE 31ST MAY, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

## Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p c.* | | | | | *In.* | |
| 17 | 30·020 | 51·0 | 10·5 | 77 | S | ·26 | KN | 10 | ·07 | Continuous Small Rain |
| 18 | 29·745 | 55·0 | 10·0 | 88 | S | ·0 | KN | 10 | ·08 | Cloud Sky Covered |
| 19 | 29·625 | 56·0 | 13·0 | 94 | E | ·0 | KN | 10 | ·15 | Calm and Cloudy |
| 20 | 29·675 | 55·0 | 13·0 | 83 | SE | ·0 | KN | 10 | ·01 | Cloudy |
| 21 | 29·456 | 54·0 | 12·0 | 88 | NW | ·26 | K | 7 | ·05 | Few faint stars only |
| 22 | 29·452 | 56·0 | 13·0 | 88 | NW | ·52 | K | 9 | | Cloud Sky Covered |
| 23 | 29·720 | 52·0 | 11·0 | 88 | S | ·26 | KN | 10 | | Sky Clouded |
| 24 | 29·545 | 48·0 | 9·0 | 88 | NW | ·52 | ·0 | 0 | ·01 | Starlight |
| 25 | 29·720 | 43·0 | 6·0 | 94 | S | ·26 | KN | 10 | ·01 | Sky Cloudy |
| 26 | 29·450 | 43·0 | 9·0 | 93 | 0 | ·0 | KN | 10 | | Sky Cloudy |
| 27 | 29·825 | 41·0 | 5·0 | 87 | SW | ·0 | KS | 10 | ·04 | Sky Covered |
| 28 | 29·920 | 52·0 | 11·0 | 87 | S | ·52 | N | 10 | ·01 | Light rain all night |
| 29 | 30·025 | 52·0 | 11·0 | 76 | SW | ·52 | K | 10 | ·27 | Sky Cloudy |
| 30 | 30·048 | 50·0 | 10·0 | 82 | S | ·26 | KN | 10 | ·02 | Cloud Sky Covered |
| 31 | 30·026 | 44·0 | 7·0 | 76 | S | ·26 | ·0 | 0 | ·3 | Star and Moonlight |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 15TH JUNE, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52' 13" S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p c.* | | | | | *In.* | |
| 1 | 30·065 | 48·0 | 9·0 | 81 | NW | ·0 | K | 8·0 | ·01 | Cloud Sky Covered |
| 2 | 30·148 | 44·0 | 7·0 | 61 | S | ·26 | K | 4·0 | ·02 | Moonlight |
| 3 | 30·048 | 45·0 | 7·0 | 87 | NE | ·0 | KN | 10 | | Cloud and Hazy |
| 4 | 30·125 | 40·0 | 4·5 | 87 | NW | ·0 | K | 10 | ·04 | Mottled K, Sky Covered |
| 5 | 30·021 | 39·0 | 4·0 | 80 | NW | ·0 | K | 3 | ·01 | Frosty |
| 6 | 30·048 | 41·0 | 5·0 | 93 | NW | ·26 | ·0 | 0 | ·02 | Clear Moon & Starlight |
| 7 | 30·093 | 40·0 | 4·5 | 87 | NW | ·26 | K | 3 | | Clear Moon & Starlight |
| 8 | 29·845 | 40·0 | 5·0 | 86 | NW | ·0 | K | 6 | | Moon and Stars |
| 9 | 29·823 | 44·0 | 7·0 | 86 | NW | ·25 | K | 4 | ·02 | Clouds and Stars |
| 10 | 29·850 | 46·0 | 8·0 | 85 | SE | ·26 | K | 6 | ·02 | Stars in the Zenith |
| 11 | 29·660 | 47·0 | 8·0 | 87 | N | ·52 | KN | 8 | ·01 | Light rain |
| 12 | 29·942 | 44·0 | 7·0 | 93 | SW | ·52 | KN | 10 | ·04 | Drizzling rain |
| 13 | 29·641 | 42·0 | 6·0 | 86 | SW | 2·60 | N | 10 | ·07 | Squally wind and rain |
| 14 | 29·230 | 45·0 | 7·0 | 100 | SW | ·52 | N | 10 | ·25 | Steady rain |
| 15 | 29·542 | 41·0 | 5·0 | 86 | W | ·62 | K | 7 | ·30 | Wind & rain abated. |

**FRANCIS ABBOTT, F.R.A.S.,** etc. Observer.

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## *METEOROLOGICAL OBSERVATIONS.*

### FROM 16TH TO THE 30TH JUNE, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

### Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 29·625 | 50·0 | 10· | 79 | N | ·0 | KN | 10 | ·03 | Unsettled |
| 17 | 29·920 | 42·0 | 5·5 | 74 | S | ·7 | KN | 8 | | Stars in Zenith |
| 18 | 30·210 | 42·0 | 5·5 | 77 | NW | ·0 | K | 6 | ·16 | Frosty Starlight |
| 19 | 30·384 | 44·0 | 7·0 | 80 | NW | ·0 | K | 10 | | Cloud Sky Covered |
| 20 | 30·362 | 45·0 | 7·5 | 80 | NW | ·0 | K | 10 | ·01 | Cloud Sky Covered |
| 21 | 30·295 | 46·0 | 8·0 | 87 | NW | ·0 | KN | 10 | | Steady rain |
| 22 | 30·275 | 36·0 | 2·0 | 75 | W | ·25 | KN | 10 | ·07 | Cloud and Frost |
| 23 | 30·325 | 35·0 | 1·5 | 84 | NW | ·25 | K | 5 | ·02 | Stars bright in Zenith |
| 24 | 30·128 | 39·0 | 4·0 | 86 | NW | ·26 | K | 4 | ·02 | Cloud Sky Covered |
| 25 | 29·820 | 44·0 | 7·0 | 86 | N | ·0 | KN | 10 | | Cloud Sky Covered |
| 26 | 29·320 | 44·0 | 7·0 | 87 | N | ·25 | K | 0 | | Moon and Starlight |
| 27 | 29·548 | 45·0 | 7·5 | 78 | NW | ·0 | KN | 10 | ·07 | Gentle rain |
| 28 | 30·148 | 47·0 | 8·0 | 80 | W | ·52 | K | 7 | ·02 | Cloud and rain |
| 29 | 30·248 | 40·0 | 5·0 | 86 | NW | ·26 | ·0 | 0 | ·01 | Moon and Starlight |
| 30 | 30·248 | 39·0 | 4·0 | 86 | NW | ·0 | K | ·7 | ·01 | Moon, Frosty, hazy |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

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# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 15TH JULY, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

**Private Observatory, Hobart Town.**

**Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 30·124 | 38· | 3· | 85 | NW | ·52 | 0 | 0 | ·01 | Clear, moonlight |
| 2 | 30·283 | 41· | 5· | 78 | N | ·0 | K | 10 | ·02 | Cloud, sky covered |
| 3 | 30·025 | 44· | 7· | 72 | NW | ·0 | K | 10 | | Ditto |
| 4 | 29·879 | 44· | 6·5 | 74 | NW | ·26 | K | 10 | | Moonlight & cloud |
| 5 | 29·545 | 41· | 5· | 79 | NW | ·0 | K | 10 | ·01 | Moon and cloud |
| 6 | 29·678 | 39· | 9· | 85 | NW | ·0 | K | 9 | | Pale moonlight |
| 7 | 29·428 | 44· | 6·5 | 86 | NW | ·0 | K | 5 | ·04 | Moon, star, and rain |
| 8 | 29·425 | 45· | 7· | 93 | 0 | ·0 | KN | 10 | ·02 | Calm and cloudy |
| 9 | 29·545 | 44· | 7· | 79 | SW | ·26 | KN | 7 | ·05 | Cloud, stars in Zenith |
| 10 | 29·948 | 41· | 5· | 78 | S | ·26 | K | 7 | ·02 | Stars to the Zenith |
| 11 | 30·248 | 41· | 5· | 73 | W | ·26 | K | 5 | ·01 | Stars from Zenith |
| 12 | 30·378 | 40· | 4· | 86 | NW | ·26 | K | 4 | .01 | Frosty, Zenith stars |
| 13 | 30·289 | 40· | 4·5 | 79 | NW | 26· | KN | 7 | | Few stars in Zenith |
| 14 | 29·720 | 32· | ·0 | 74 | NW | ·52 | N | 10 | ·12 | Jet dark, not a star |
| 15 | 29·925 | 43· | 6·0 | 80 | NW | ·52 | N | 7 | ·03 | Few watery stars in Zenith |

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## *METEOROLOGICAL OBSERVATIONS.*

### FROM 16TH TO THE 31ST JULY, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* |  | *Relative Humidity.* | *Wind.* |  | *Cloud.* |  | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | *Fahrenheit.* | *Centigrade.* |  | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* |  |  |
|  |  |  |  | *p.c.* |  |  |  |  | *In.* |  |
| 16 | 29·987 | 49· | 9·5 | 80 | NW | ·52 | N | 10 | ·03 | Small rain |
| 17 | 30·078 | 48· | 9· | 93 | NW | ·0 | KN | 10 | ·01 | Cloud, Sky Covered |
| 18 | 30·385 | 43· | 6· | 79 | SE | ·25 | K | 7 | ·04 | Stars in the Zenith |
| 19 | 30·345 | 41· | 5· | 92 | NE | ·26 | K | 6 | ·07 | Stars in the Zenith |
| 20 | 30·075 | 41· | 5· | 85 | N | ·25 | K | 7 | ·01 | Stars in the Zenith |
| 21 | 30·058 | 46· | 8· | 86 | SW | ·26 | KN | 10 | ·01 | Cloud, Sky Covered |
| 22 | 29·975 | 43· | 6· | 80 | NW | ·26 | 0 | 0 | ·05 | Starlight |
| 23 | 29·825 | 46· | 8· | 68 | W | ·52 | K | 6 | .01 | Stars in the Zenith |
| 24 | 29·920 | 40· | 4·5 | 79 | S | ·26 | K | 7 |  | Stars in the Zenith |
| 25 | 30·025 | 39· | 4· | 73 | SE | ·26 | 0 | 0 | ·03 | Starlight |
| 26 | 30·025 | 36· | 2· | 85 | SW | ·26 | K | 5 | ·01 | Moon, Stars and Frost |
| 27 | 30·125 | 38· | 3·5 | 84 | NW | ·26 | K | 4 | ·01 | Moon, Stars and Frost |
| 28 | 30·125 | 41· | 5· | 86 | NW | ·26 | K | 10 |  | Moon, cloudy |
| 29 | 30·045 | 45· | 7·5 | 86 | NW | ·0 | K | 0 |  | Cloud, Sky covered |
| 30 | 29·979 | 50· | 10· | 87 | 0 | ·0 | K | 10 |  | Moon and Stars, cloudy |
| 31 | 29·848 | 47· | 8· | 86 | NW | ·0 | K | 8 |  | M'n clouded |

**FRANCIS ABBOTT, F.R.A.S. etc. Observer.**

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# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 16TH AUGUST, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29·925 | 42·5 | 5· | 92 | SE | ·26 | 7 | K | ·01 | Moon, Star and Cloud |
| 2 | 30·028 | 41 | | 85 | NW | ·52 | 10 | N | ·01 | Rain and Cloud |
| 3 | 29·945 | 39· | 4· | 86 | S | ·25 | 10 | N | ·63 | Showery |
| 4 | 29·945 | 39· | 4· | 86 | S | ·25 | 10 | N | ·28 | Rain and Snow |
| 5 | 30·245 | 40· | 5· | 86 | SW | ·26 | 6 | K | ·02 | Hazy, moonlight |
| 6 | 30·525 | 39· | 4· | 79 | NW | ·26 | 6 | K | ·0 | Moon and Starlight |
| 7 | 30·450 | 45· | 7· | 86 | N | ·10 | 10 | KN | ·0 | Cloud, Sky Covered |
| 8 | 30·178 | 47· | 5· | 80 | S | ·26 | 10 | N | ·06 | Do., Rain, dark |
| 9 | 29·942 | 42 | 7·5 | 86 | N | ·26 | 10 | N | ·01 | Cloud, Sky covered |
| 10 | 29·729 | 48· | 9· | 93 | N | ·0 | 10 | N | ·0 | Cloud, Sky covered |
| 11 | 29·545 | 46· | 8· | 86 | NW | ·26 | 10 | N | ·45 | Cloud and Rain |
| 12 | 29·678 | 47· | 8· | 93 | NW | ·52 | 10 | N | ·33 | Rain and Cloud |
| 13 | 29·828 | 47· | 8· | 80 | S | ·26 | 10 | KN | ·01 | Cloud, Sky covered |
| 14 | 29·748 | 46· | 8· | 86 | E | ·0 | 10 | N | ·02 | Cloudy, Sky covered |
| 15 | 29·544 | 46· | 8· | 86 | N | ·0 | 5 | N | ·0 | Horizon cl'dy, zenith brilliant |
| 16 | 29·210 | 49· | 9· | 100 | N | ·10 | 10 | N | ·20 | Rain |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

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# *METEOROLOGICAL OBSERVATIONS.*

## FROM 17TH TO THE 31ST AUGUST, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 17 | 29·210 | 49· | 9· | 86 | NE | ·0 | 10 | KN | ·20 | Cloud and Rain |
| 18 | 30·139 | 52· | 11· | 86 | N | ·52 | K | 7 | ·10 | Stars brilliant at the zenith. Cloud at horizon |
| 19 | 30·164 | 50· | 10· | 80 | NW | ·0 | 10 | KN | — | Cloud, Sky covered |
| 20 | 30·075 | 47· | 8· | 86 | NW | ·26 | 5 | K | — | Stars brill'nt in the zenith |
| 21 | 30·218 | 52· | 11· | 70 | NW | ·26 | 9 | K | — | Cloud, Sky Covered |
| 22 | 30·245 | 52· | 11· | 80 | S | ·0 | 10 | KN | — | Cloud, Sky covered |
| 23 | 30·027 | 51· | 11·5 | 75 | N | ·26 | 4 | K | — | Stars faint |
| 24 | 29·978 | 52· | 11·5 | 65 | NW | ·26 | 4 | K | — | Moon and Starlight |
| 25 | 30·048 | 50· | 10· | 80 | NW | ·26 | 4 | K | — | Moon, Cloud and Star |
| 26 | 30·245 | 53· | 12· | 76 | SE | ·0 | 10 | K | — | Small Rain |
| 27 | 30·242 | 49· | 9·5 | 80 | E | ·26 | 5 | K | 10· | Moon, Star, and Cloud |
| 28 | 29·945 | 53· | 12· | 80 | SW | ·52 | 7 | K | — | Moon and Cloud |
| 29 | 29·878 | 54· | 12· | 88 | S | ·26 | 10 | KN | — | Light Rain |
| 30 | 30·145 | 49· | 9·5 | 80 | SE | ·26 | 10 | K | ·07 | Moon, Cloud |
| 31 | 30·218 | 52· | 11· | 81 | SE | ·26 | 10 | K | ·01 | Sky thick and hazy |

FRANCIS ABBOTT, F.R.A.S., etc. Observer

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# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 16TH SEPTEMBER, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

**Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29·925 | 54·0 | 12·5 | 76 | NW | ·0 | 10 | K | ·01 | Sky cloudy |
| 2 | 29·545 | 55·0 | 13·0 | 82 | NW | ·26 | 10 | K | — | Sky cloudy |
| 3 | 30·148 | 48·0 | 9·0 | 80 | SW | ·52 | 6 | K | ·02 | Moonlight |
| 4 | 30·148 | 48·0 | 9·0 | 80 | SW | ·52 | 6 | K | ·01 | Moonlight |
| 5 | 30·047 | 49·0 | 9·5 | 73 | SW | ·26 | 7 | K | — | Pale Moonlight |
| 6 | 29·978 | 50·0 | 10·0 | 75 | SE | ·26 | 10 | KN | — | Cloudy, very dark |
| 7 | 29·978 | 50·0 | 10·0 | 84 | E | ·26 | 0 | O | — | Starlight, brilliant |
| 8 | 30·078 | 55·0 | 13·0 | 88 | SE | ·26 | 10 | KN | — | Very dark |
| 9 | 30·275 | 52·0 | 11·0 | 81 | SE | ·26 | 0 | O | — | Starlight |
| 10 | 30·078 | 48·0 | 9·0 | 81 | NW | ·52 | 7 | K | — | Stars, Cloud and Moon |
| 11 | 29·785 | 60·0 | 15·0 | 77 | NW | ·52 | 10 | KN | ·12 | Wind and Cloud |
| 12 | 29·748 | 50·0 | 10·0 | 70 | NW | ·26 | 5 | K | ·20 | Stars round Zenith |
| 13 | 29·747 | 52·0 | 11·0 | 81 | NW | ·26 | 4 | K | ·06 | Zenith, stars brilliant |
| 14 | 30·078 | 50·0 | 10·0 | 86 | W | ·26 | 10 | KN | ·01 | Dark and cloudy, |
| 15 | 30·285 | 48·0 | 9·0 | 80 | S | ·0 | 0 | O | — | Stars brill'nt |
| 16 | 30·145 | 45·0 | 7·5 | 68 | S | ·52 | 0 | O | — | Frosty, Stars brilliant, followed by snow storm |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

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## *METEOROLOGICAL OBSERVATIONS.*

### FROM 16TH TO THE 30TH SEPTEMBER, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

### Private Observatory, Hobart Town.

**Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 30·285 | 48·0 | 9·0 | 86 | S | ·0 | 0 | O | — | Stars bright, followed close by a snow storm |
| 17 | 29·848 | 54·0 | 12·0 | 87 | S | ·5 | 10 | KN | — | Slight rain |
| 18 | 29·700 | 50·0 | 10·0 | 93 | S | ·65 | 10 | N | ·04 | Rain all day |
| 19 | 29·745 | 46·0 | 8·0 | 93 | S | ·26 | 7 | K | ·65 | Stars by places |
| 20 | 29·825 | 52·0 | 11·0 | 86 | S | ·26 | 10 | KN | ·01 | Cloud, sky covered |
| 21 | 29·945 | 51·0 | 10·0 | 86 | SE | ·26 | 10 | KN | — | Cloud, sky covered |
| 22 | 29·610 | 57·0 | 14·0 | 88 | NW | ·0 | 10 | K | — | Cloud, sky covered |
| 23 | 29·520 | 52·0 | 11·0 | 87 | SE | ·0 | 5 | K | ·04 | Moon, Star, and Cloud |
| 24 | 29·715 | 55·0 | 13·0 | 81 | O | ·0 | 10 | K | ·09 | Cloud, sky covered |
| 25 | 29·548 | 56·0 | 13·0 | 88 | S | ·26 | 0 | O | ·02 | Moon, Cloud, and Star |
| 26 | 29·624 | 50·0 | 10·0 | 86 | S | ·26 | 10 | K | — | Cloudy sky, covered |
| 27 | 29·926 | 54·0 | 12·0 | 75 | W | ·26 | 9 | K | ·04 | Moon, covered by white cloud |
| 28 | 29·967 | 43·0 | 6·0 | 79 | SW | ·52 | 6 | K | ·20 | Moon, Star, and Cloud |
| 29 | 29·925 | 48·0 | 9·0 | 74 | NW | ·52 | 7 | K | ·26 | Showery, Moon and Cloud |
| 30 | 29·978 | 44·0 | 7·0 | 73 | SW | ·52 | 7 | KN | ·04 | Squally all day |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

## *METEOROLOGICAL OBSERVATIONS.*

### FROM 1ST TO THE 16TH OCTOBER, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 30·025 | 52·0 | 25·0 | 69 | NW | ·52 | 10 | K | ·03 | Cumula covering the Moon |
| 2 | 29·925 | 55·0 | 13·0 | 87 | NW | ·26 | 7 | K | ·01 | Moon clouded |
| 3 | 30·125 | 55·0 | 13·0 | 86 | SE | ·26 | 7 | K | — | Do. do. |
| 4 | 29·958 | 50·0 | 10·0 | 74 | S | ·49 | 5 | K | — | Stars and Moon |
| 5 | 29·725 | 59·0 | 15·0 | 77 | NW | ·26 | 4 | K | — | Dark Clouds and Stars |
| 6 | 29·648 | 59·0 | 15·0 | 67 | NW | ·26 | 4 | K | — | Stars in Zenith |
| 7 | 29·975 | 50·0 | 10·0 | 75 | SE | ·52 | 10 | N | ·02 | Squally |
| 8 | 29·825 | 52·0 | 11·0 | 74 | S | ·26 | 7 | K | ·25 | Few faint Stars |
| 9 | 29·645 | 54·0 | 12·0 | 76 | S | ·26 | 7 | K | ·01 | Dark and Cloudy |
| 10 | 29·500 | 50·0 | 10·0 | 81 | W | ·62 | 10 | N | — | Rain |
| 11 | 29·926 | 43·0 | 6·0 | 79 | S | ·52 | 4 | K | ·25 | Rain, Stars in Zenith |
| 12 | 30·038 | 52·0 | 11·0 | 82 | SE | ·52 | 4 | K | ·36 | Starlight |
| 13 | 30·176 | 56·0 | 14·5 | 76 | SE | ·26 | 4 | K | ·10 | Frosty |
| 14 | 30·045 | 52·0 | 11·0 | 70 | SE | ·26 | 0 | 0 | — | Starlight, Frosty |
| 15 | 29·964 | 55·0 | 15·0 | 81 | NW | ·52 | 10 | KN | — | Sky cloudy |
| 16 | 29·746 | 71·0 | 21·5 | 78 | SE | ·0 | 10 | KN | – | Cloudy and sultry |

**FRANCIS ABBOTT**, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 17TH TO THE 31ST OCTOBER, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

### Private Observatory, Hobart Town.

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* *Fahrenheit.* | *Thermometers.* *Centigrade.* | *Relative Humidity.* | *Wind.* *Direction from* | *Wind.* *Force in lb. per square foot.* | *Cloud.* *Amount.* | *Cloud.* *Character.* | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *p.c.* | | | | | *In.* | |
| 17 | 29·928 | 59·0 | 15·0 | 72 | S | ·26 | 10 | Nm | ·14 | Cloudy for rain |
| 18 | 29·525 | 59·0 | 15·0 | 88 | SE | ·26 | 10 | KN | ·01 | Cloud, Sky covered |
| 19 | 29·456 | 57·0 | 14·0 | 76 | NW | ·26 | 5 | K | ·45 | Few Stars and Clouds |
| 20 | 29·524 | 50·0 | 15·0 | 72 | NW | ·52 | 9 | K | ·10 | Sky Cloudy |
| 21 | 29·325 | 61·0 | 16·0 | 67 | NW | ·65 | 0 | O | ·02 | Moon and Starlight |
| 22 | 29·549 | 55·0 | 13·0 | 77 | NW | ·26 | 10 | KN | — | Sky Cloudy |
| 23 | 29·965 | 54·0 | 12·0 | 75 | SE | ·26 | 10 | K | – | Do. do. |
| 24 | 30·178 | 59·0 | 15·0 | 82 | SE | ·26 | 10 | K | – | Do. do. |
| 25 | 29·945 | 59·0 | 15·0 | 77 | S | ·26 | 0 | O | 07 | Moon and Starlight |
| 26 | 29·525 | 56·0 | 13·0 | 77 | NE | ·26 | 0 | O | — | Do. do. |
| 27 | 29·320 | 59·0 | 15·0 | 77 | NE | ·52 | 9 | K | — | Moon clouded |
| 28 | 29·325 | 58·0 | 14·0 | 71 | NW | ·5 | 10 | K | ·02 | Sky cloudy |
| 29 | 29·675 | 55·0 | 13·0 | 76 | SW | ·52 | 7 | K | ·02 | Do. do. |
| 30 | 29·745 | 61·0 | 16·0 | 72 | NW | ·52 | 10 | K | ·04 | Do. do. |
| 31 | 29·767 | 60·0 | 15·0 | 77 | KN | ·0 | 10 | KN | ·03 | Rain |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# *METEOROLOGICAL OBSERVATIONS.*

## From 1st to the 15th November, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

### Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* *Fahrenheit.* | *Thermometers.* *Centigrade.* | *Relative Humidity.* | *Wind.* *Direction from* | *Wind.* *Force in lb. per square foot.* | *Cloud.* *Amount.* | *Cloud.* *Character.* | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29·872 | 58·0 | 16·0 | 83 | W | ·52 | 10 | K | ·01 | Sky cloudy |
| 2 | 29·825 | 56·0 | 13·0 | 66 | NW | ·62 | 0 | O | ·01 | Starlight |
| 3 | 29·765 | 52·0 | 11·0 | 65 | SW | 2·60 | 0 | O | ·01 | Starlight, Brilliant |
| 4 | 29·736 | 55·0 | 13·0 | 62 | W | ·52 | 7 | KN | ·01 | Cloudy |
| 5 | 29·945 | 56·0 | 13·0 | 77 | N | ·10 | 10 | N | ·0 | Calm and Cloudy |
| 6 | 29·747 | 57·0 | 13·0 | 34 | NW | ·0 | 4 | K | ·07 | Stars, cloudy |
| 7 | 29·538 | 59·0 | 15·0 | 67 | O | ·0 | 10 | KN | ·04 | Calm and Cloudy |
| 8 | 29·445 | 59·0 | 15·0 | 77 | W | ·52 | 7 | K | 07 | Stars and Clouds |
| 9 | 29·725 | 55·0 | 13·0 | 67 | NE | ·52 | 5 | K | ·0 | Starlight |
| 10 | 29·525 | 65·0 | 18·5 | 73 | O | ·0 | 4 | K | 1·20 | Clouds and Starlight |
| 11 | 29·075 | 57·0 | 14·0 | 77 | E | ·26 | 10 | KN | ·02 | Rain all day |
| 12 | 29·475 | 54·0 | 12·0 | 73 | NW | ·26 | 0 | O | ·13 | Starlight |
| 13 | 29·825 | 56·0 | 13·0 | 72 | S | ·0 | 10 | N | ·12 | Clouds and rain |
| 14 | 29·925 | 48·0 | 9·0 | 86 | S | ·25 | 0 | O | ·01 | Starlight |
| 15 | 29·915 | 57·0 | 14·0 | 72 | S | ·0 | 5 | K | ·01 | Stars by Phases |

Francis Abbott, F.R.A.S., etc., Observer.

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| | | | |
|---|---|---|---|
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[illegible]

[illegible]

[illegible]

# *METEOROLOGICAL OBSERVATIONS.*

## From 16th to the 30th November, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* *Fahrenheit.* | *Thermometers.* *Centigrade.* | *Relative Humidity.* | *Wind.* *Direction from* | *Wind.* *Force in lb. per square foot.* | *Cloud.* *Amount.* | *Cloud.* *Character.* | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 29·645 | 54·0 | 12·0 | 76 | NW | ·0 | 10 | N | ·12 | Steady rain |
| 17 | 29·628 | 52·0 | 11·0 | 86 | SW | ·52 | 4 | K | ·01 | Stars hazy |
| 18 | 29·725 | 59·0 | 15·0 | 82 | S | ·0 | 3 | K | 1·25 | Calm and Cloudy |
| 19 | 29·925 | 52·0 | 11·0 | 93 | 0 | ·0 | 10 | KN | ·02 | Clouds and rain |
| 20 | 29·715 | 53·0 | 12·0 | 71 | S | ·52 | 4 | K | ·02 | Starlight |
| 21 | 29·452 | 57·0 | 14·0 | 77 | S | ·0 | 4 | K | ·02 | Stars and Clouds |
| 22 | 29·625 | 50·0 | 10·0 | 81 | NW | ·25 | 7 | K | ·40 | Sky hazy |
| 23 | 29·810 | 54·0 | 12·5 | 81 | N | ·5 | 4 | K | ·0 | Moon, stars, and clouds |
| 24 | 29·521 | 59·0 | 15·0 | 82 | S | ·0 | 10 | K | ·5 | Cloudy, sky covered |
| 25 | 29·435 | 53·0 | 12·0 | 93 | S | ·0 | 10 | KN | ·40 | Rain, showery |
| 26 | 29·245 | 52·0 | 11·0 | 76 | S | ·0 | 10 | KN | ·0 | Steady rain |
| 27 | 29·458 | 50·0 | 10·0 | 81 | SW | ·26 | 9 | K | ·04 | Heavy clouds and Moon |
| 28 | 29·895 | 54·0 | 12·0 | 87 | S | ·0 | 10 | KN | ·40 | Large clouds and Moon |
| 29 | 29·678 | 57·0 | 14·0 | 88 | NE | ·0 | 8 | K | ·0 | Moon and heavy cloud |
| 30 | 29·625 | 61·0 | 16·0 | 82 | 0 | ·0 | 10 | KN | ·04 | Rain and Lightning |

**Francis Abbott, F.R.A.S., etc., Observer.**

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# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 15TH DECEMBER, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory Hobart Town.
Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.
*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29·648 | 59·0 | 15·0 | 82 | NW | ·26 | 7 | K | ·15 | Heavy cloud and moon |
| 2 | 29·648 | 59·0 | 15·0 | 82 | NW | ·25 | 8 | KN | ·03 | Dark conglomerated clouds |
| 3 | 29·475 | 59·0 | 15·0 | 77 | NW | ·52 | 7 | KN | | Stars in the Zenith |
| 4 | 29·745 | 59·0 | 14·0 | 88 | NE | ·0 | 10 | N | ·10 | Very dark |
| 5 | 29·715 | 57·0 | 14·0 | 82 | N | ·0 | 10 | NN | ·14 | Dark and Cloudy |
| 6 | 29·679 | 59·0 | 15·0 | 88 | SW | ·0 | 7 | K | ·05 | Stars in the Zenith |
| 7 | 29·045 | 59·0 | 15·0 | 94 | SW | ·26 | 10 | KN | ·0 | Cloud, sky covered |
| 8 | 29·545 | 59·0 | 15·0 | 94 | S | ·52 | 5 | K | ·22 | Cloud and squall |
| 9 | 29·817 | 59·0 | 15·0 | 82 | S | ·0 | 10 | KN | ·06 | Cloud, sky covered |
| 10 | 29·725 | 57·0 | 14·0 | 82 | SW | ·52 | 10 | K | ·02 | Cloudy and hazy |
| 11 | 29·925 | 57·0 | 14·0 | 81 | SW | ·26 | 7 | K | ·04 | Faint stars in Zenith |
| 12 | 29·974 | 59·0 | 15·0 | 88 | S | ·52 | 6 | K | ·01 | Stars at Zenith |
| 13 | 29·925 | 62·0 | 17·0 | 72 | S | ·0 | 10 | K | ·02 | Cloud, sky covered |
| 14 | 29·778 | 64·0 | 18·0 | 78 | S | ·25 | 6 | K | | Stars at Zenith |
| 15 | 29·848 | 65·0 | 18·0 | 83 | S | ·26 | 10 | K | | Cloud and hazy, stars |

FRANCIS ABBOTT, F R.A.S., etc., Observer.

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# *METEOROLOGICAL OBSERVATIONS.*

## From 16th to the 31st December, 1879.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

**Private Observatory, Hobart Town.**

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 29·958 | 63·0 | 17·0 | 77 | S | ·0 | 10 | KN | | Cloud, sky covered |
| 17 | 29·825 | 75·0 | 24·0 | 66 | S | ·26 | 10 | KN | | Do. do. |
| 18 | 29·525 | 54·0 | 12·0 | 76 | SW | ·52 | 10 | N | ·01 | Cloud and rain |
| 19 | 29·478 | 59·0 | 15·0 | 82 | W | ·65 | 7 | K | ·26 | Moon, stars, and clouds |
| 20 | 29·500 | 55·0 | 13·0 | 71 | SW | 2·60 | 10 | K | ·04 | Do. do. |
| 21 | 29·545 | 55·0 | 13·0 | 76 | W | ·26 | 9 | KN | ·01 | Clondy |
| 22 | 29·758 | 49·0 | 9·5 | 86 | W | ·52 | 8 | K | ·07 | Squally |
| 23 | 29·976 | 53·0 | 12·0 | 86 | W | ·52 | 10 | K | ·10 | Conglomerate cumula |
| 24 | 29·928 | 56·0 | 13·5 | 81 | SW | ·26 | 10 | K | ·01 | Cloud, sky covered |
| 25 | 29·748 | 60·0 | 15·5 | 76 | S | ·0 | 10 | K | | Sky cloudy |
| 26 | 29·495 | 69·0 | 20·0 | 78 | S | ·0 | 10 | K | | Moon clouded |
| 27 | 29·078 | 61·0 | 16·0 | 82 | NW | ·52 | 10 | K | ·07 | Large black cumula |
| 28 | 29·565 | 57·0 | 14·0 | 70 | SW | ·52 | 10 | K | ·03 | Do. do. |
| 29 | 29·785 | 67·0 | 19·0 | 73 | S | ·0 | 7 | K | ·01 | Moonlight |
| 30 | 29·975 | 59·0 | 15·0 | 88 | W | ·26 | 9 | K | | Clouds and Moon |
| 31 | 30·045 | 61·0 | 16·0 | 82 | S | ·26 | 10 | KN | ·13 | Cld. sky cvd. |

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

## *RESULTS of METEOROLOGICAL OBSERVATIONS taken at HOBART TOWN during the Year* 1879.

PRIVATE OBSERVATORY.

Latitude, 42° 52′ 13″ S. Height above sea level, 67 feet. Longitude 9h. 49m. 29·2s. E.

| *Months.* | *Barometer.* | *Thermometers (Reading.)* | | *Thermometers (Self-registering.)* | | | *Relative humidity per cent. Mean of two daily observations.* | *Clouds (Scale, 0·10).* | | *Wind (lbs. per square foot.)* | | | *Rain in Inches. Total Amount.* | *Spontaneous evaporation. Total amount.* | *Ozone.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Mean of two daily readings.* | *Centigrade Mean of two daily readings.* | *Fahrenheit Mean of two daily readings.* | *Mean of highest in Sun.* | *Mean of highest in Shade.* | *Mean of lowest on Grass.* | | *Mean amount for month.* | *Prevailing Character.* | *Prevailing Direction.* | *Mean force for Month.* | *Maximum force.* | | | *Chromatic Scale, Mean.* |
| January........ | 29·756 | 7·39 | 64·55 | 109·45 | 78·16 | 38·00 | ·68 | 5·30 | K | S.E., S., N.W. | ·90 | 2·60 | ·80 | 6·42 | 5·33 |
| February ....... | 29·737 | 12·37 | 62·32 | 120·00 | 76·80 | 37·00 | ·71 | 6·50 | K | N.W., S., S.E. | 1·31 | 10·42 | ·60 | 4·70 | 5·25 |
| March............ | 29·933 | 10·00 | 57·42 | 102·81 | 68·00 | 35·80 | ·75 | 7·00 | K | N.W., W., S. | ·38 | 2·60 | 2·24 | 2·23 | 5·70 |
| April ............ | 30·057 | 10·10 | 56·00 | 98·80 | 67·47 | 36·67 | ·78 | 6·00 | K | N.W. | ·24 | 2·60 | 1·91 | 1·55 | 5·40 |
| May ............ | 29·924 | 7·70 | 50·00 | 94·00 | 58·30 | 36·00 | ·87 | 7·87 | K | N.W., S. | ·24 | 2·60 | 1·20 | ·28 | 6·00 |
| June ............ | 29·958 | 4·38 | 44·65 | 80·60 | 53·93 | 32·80 | ·84 | 6·53 | K | N.W. | ·51 | 5·21 | 1·23 | ·45 | 4·00 |
| July ............ | 29·983 | 5·10 | 48·87 | 85·70 | 54·00 | 32·10 | ·81 | 7·00 | K | N.W. | ·19 | ·52 | ·62 | ·51 | 4·00 |
| August ........ | 30·000 | 7·21 | 49·11 | 88·78 | 57·80 | 35·00 | ·80 | 8·00 | K | N.W. | ·28 | 2·60 | 2·37 | 1·95 | 5·42 |
| September ...... | 29·990 | 10·20 | 54·27 | 97·27 | 63·43 | 40·30 | ·75 | 7·00 | K | N.W., S.E. | ·46 | 5·21 | ·92 | ·94 | 4·23 |
| October ......... | 29·791 | 12·68 | 58·00 | 109·50 | 67·70 | 40·45 | ·69 | 7·00 | K | N.W. | ·78 | 2·60 | 1·84 | 3·07 | 4·23 |
| November........ | 29·659 | 12·70 | 57·90 | 106·10 | 67·00 | 39·66 | ·74 | 8·13 | K | S. | 1·04 | 15·21 | 5·76 | 2·75 | 4·57 |
| December ...... | 29·712 | 14·71 | 61·56 | 114·23 | 70·30 | 40·30 | ·75 | 8·00 | K | N.W., S., S.W. | ·83 | 5·21 | 1·58 | 3·45 | 3·30 |
| Sum ... ... .... | 358·500 | 114·54 | 664·65 | 1207·24 | 782·89 | 444·08 | 9·17 | 84·33 | | | 7·16 | 57·38 | 21·07 | 28·30 | 57·43 |
| Mean for Year... | 29·875 | 9·54 | 55·39 | 100·60 | 65·24 | 37·00 | ·76 | 7·00 | K | N.W., S. | ·60 | 4·87 | 1·76 | 2·36 | 4·79 |

**At Hobart Town the Observations are taken twice daily, viz., at 7·30 a.m., and 4·30 p.m.**
**The mean is in all cases taken from the sums of the two daily registers, not from the maximum and minimum**
**The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.**
**The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.**

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

## *METEOROLOGICAL OBSERVATIONS.*

### From 16th to the 31st December, 1879.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

### Private Observatory, Hobart Town.

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 16 | 29·958 | 63·0 | 17·0 | 77 | S | ·0 | 10 | KN | | Cloud, sky covered |
| 17 | 29·825 | 75·0 | 24·0 | 66 | S | ·26 | 10 | KN | | Do. do. |
| 18 | 29·525 | 54·0 | 12·0 | 76 | SW | ·52 | 10 | N | ·01 | Cloud and rain |
| 19 | 29·478 | 59·0 | 15·0 | 82 | W | ·65 | 7 | K | ·26 | Moon, stars, and clouds |
| 20 | 29·500 | 55·0 | 13·0 | 71 | SW | 2·60 | 10 | K | ·04 | Do. do. |
| 21 | 29·545 | 55·0 | 13·0 | 76 | W | ·26 | 9 | KN | ·01 | Cloudy |
| 22 | 29·758 | 49·0 | 9·5 | 86 | W | ·52 | 8 | K | ·07 | Squally |
| 23 | 29·976 | 53·0 | 12·0 | 86 | W | ·52 | 10 | K | ·10 | Conglomerate cumula |
| 24 | 29·928 | 56·0 | 13·5 | 81 | SW | ·26 | 10 | K | ·01 | Cloud, sky covered |
| 25 | 29·748 | 60·0 | 15·5 | 76 | S | ·0 | 10 | K | | Sky cloudy |
| 26 | 29·495 | 69·0 | 20·0 | 78 | S | ·0 | 10 | K | | Moon clouded |
| 27 | 29·078 | 61·0 | 16·0 | 82 | NW | ·52 | 10 | K | ·07 | Large black cumula |
| 28 | 29·565 | 57·0 | 14·0 | 70 | SW | ·52 | 10 | K | ·03 | Do. do. |
| 29 | 29·785 | 67·0 | 19·0 | 73 | S | ·0 | 7 | K | ·01 | Moonlight |
| 30 | 29·975 | 59·0 | 15·0 | 88 | W | ·26 | 9 | K | | Clouds and Moon |
| 31 | 30·045 | 61·0 | 16·0 | 82 | S | ·26 | 10 | KN | ·13 | Cld. sky cvd. |

**Francis Abbott, F.R.A.S., etc., Observer.**

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

## *RESULTS of METEOROLOGICAL OBSERVATIONS taken at HOBART TOWN during the Year* 1879.

PRIVATE OBSERVATORY.

**Latitude, 42° 52′ 13″ S.** **Height above sea level, 67 feet.** **Longitude 9h. 49m. 29·2s. E.**

| *Months.* | *Barometer.* | *Thermometers (Reading.)* | | *Thermometers (Self-registering.)* | | | *Relative humidity per cent. Mean of two daily observations.* | *Clouds (Scale, 0·10).* | | *Wind (lbs. per square foot.)* | | | *Rain in Inches. Total Amount.* | *Spontaneous evaporation. Total amount.* | *Ozone.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Mean of two daily readings.* | *Centigrade Mean of two daily readings.* | *Fahrenheit Mean of two daily readings.* | *Mean of highest in Sun.* | *Mean of highest in Shade.* | *Mean of lowest on Grass.* | | *Mean amount for month.* | *Prevailing Character.* | *Prevailing Direction.* | *Mean force for Month.* | *Maximum force.* | | | *Chromatic Scale, Mean.* |
| **January** ......... | 29·756 | 7·39 | 64·55 | 109·45 | 78·16 | 38·00 | ·68 | 5·30 | K | S.E., S., N.W. | ·90 | 2·60 | ·80 | 6·42 | 5·33 |
| **February** ....... | 29·737 | 12·37 | 62·32 | 120·00 | 76·80 | 37·00 | ·71 | 6·50 | K | N.W., S., S.E. | 1·31 | 10·42 | ·60 | 4·70 | 5·25 |
| **March** ............ | 29·933 | 10·00 | 57·42 | 102·81 | 68·00 | 35·80 | ·75 | 7·00 | K | N.W., W., S. | ·38 | 2·60 | 2·24 | 2·23 | 5·70 |
| **April** ............ | 30·057 | 10·10 | 56·00 | 98·80 | 67·47 | 36·67 | ·78 | 6·00 | K | N.W. | ·24 | 2·60 | 1·91 | 1·55 | 5·40 |
| **May** .............. | 29·924 | 7·70 | 50·00 | 94·00 | 58·30 | 36·00 | ·87 | 7·87 | K | N.W., S. | ·24 | 2·60 | 1·20 | ·28 | 6·00 |
| **June** ............. | 29·958 | 4·38 | 44·65 | 80·60 | 53·93 | 32·80 | ·84 | 6·53 | K | N.W. | ·51 | 5·21 | 1·23 | ·45 | 4·00 |
| **July** .............. | 29·983 | 5·10 | 48·87 | 85·70 | 54·00 | 32·10 | ·81 | 7·00 | K | N.W. | ·19 | ·52 | ·62 | ·51 | 4·00 |
| **August** .......... | 30·000 | 7·21 | 49·11 | 88·78 | 57·80 | 35·00 | ·80 | 8·00 | K | N.W. | ·28 | 2·60 | 2·37 | 1·95 | 5·42 |
| **September** ....... | 29·990 | 10·20 | 54·27 | 97·27 | 63·43 | 40·30 | ·75 | 7·00 | K | N.W., S.E. | ·46 | 5·21 | ·92 | ·94 | 4·23 |
| **October** .......... | 29·791 | 12·68 | 58·00 | 109·50 | 67·70 | 40·45 | ·69 | 7·00 | K | N.W. | ·78 | 2·60 | 1·84 | 3·07 | 4·23 |
| **November**........ | 29·659 | 12·70 | 57·90 | 106·10 | 67·00 | 39·66 | ·74 | 8·13 | K | S. | 1·04 | 15·21 | 5·76 | 2·75 | 4·57 |
| **December** ....... | 29·712 | 14·71 | 61·56 | 114·23 | 70·30 | 40·30 | ·75 | 8·00 | K | N.W., S., S.W. | ·83 | 5·21 | 1·58 | 3·45 | 3·30 |
| Sum ........ .... | 358·500 | 114·54 | 664·65 | 1207·24 | 782·89 | 444·08 | 9·17 | 84·33 | | | 7·16 | 57·38 | 21·07 | 28·30 | 57·43 |
| Mean for Year... | 29·875 | 9·54 | 55·39 | 100·60 | 65·24 | 37·00 | ·76 | 7·00 | K | N.W., S. | ·60 | 4·87 | 1·76 | 2·36 | 4·79 |

**At Hobart Town the Observations are taken twice daily, viz., at 7·30 a.m., and 4·30 p.m.**
**The mean is in all cases taken from the sums of the two daily registers, not from the maximum and minimum**
**The direction of the wind is registered from currents at a height of 92 feet above sea level, and its force in lbs. per square foot.**
**The relative quantity of rain that fell under the different winds is registered each morning at 7·30 a.m.**

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

# MONTHLY MEANS OF OBSERVATIONS TAKEN AT NEW NORFOLK, TASMANIA, 1879.

**Latitude 42° 46′ 48″ South.** **Longitude 147° 4′ 45″ East.**

| Months. | Barometer. | Thermometer. | | | | | | Humidity of Air. | | | Condensation. | | Evaporation. | Ozone | Clouds. | Winds. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | At sea level Temperature 32°. | Mean Temperature of two Daily Registers | Mean Temperature of max. & min. in shade | Mean Diurnal Range | Mean Solar Intensity. | Mean Terrestrial Radiation. | Dew Point, Mean position. | Humidity of Air per 100. | Elastic Force of Vapor per 1000. | Rain in Inches. | No. of Days on which Rain fell. | Spontaneous Evaporation in Inches. | Mean Daily Amount. | Mean Daily Amount. | Prevailing Direction. | Force in lbs. per sq. inch. |
| | | ° | ° | ° | ° | ° | ° | | | | | | | | | |
| January.. ... | 29·979 | 64·64 | 63·80 | 30·19 | 135·90 | 41·61 | 53·08 | ·67 | ·405 | ·40 | 7 | 6·73 | 6·90 | 3·16 | SE.W | |
| February .... | 29·934 | 60·50 | 61·17 | 28·80 | 134·50 | 39·73 | 48·49 | ·64 | ·341 | ·74 | 5 | 4·36 | 6·17 | 3·62 | NW.SE | |
| March ...... | 30·064 | 57·12 | 57·34 | 22·16 | 129·00 | 39·19 | 48·41 | ·72 | ·241 | 2·81 | 10 | 2·88 | 7·32 | 5·61 | W.SE | |
| April ........ | 30·125 | 51·74 | 54·55 | 24·48 | 123·88 | 35·51 | 44·30 | ·78 | ·293 | ·71 | 9 | 1·94 | 6·50 | 5·31 | W.NW | |
| May ......... | 30·030 | 46·82 | 48·01 | 17·32 | 105·80 | 33·22 | 42·56 | ·86 | ·273 | ·81 | 10 | ·91 | 6·66 | 6·70 | W.SE | |
| June ........ | 30·050 | 40·32 | 42·00 | 15·36 | 98·48 | 28·70 | 36·58 | ·86 | ·216 | 2·23 | 13 | ·75 | 5·70 | 6·10 | W.NW | |
| July ........ | 30·063 | 39·37 | 41·17 | 17·25 | 98·80 | 26·38 | 35·38 | ·87 | ·207 | ·73 | 7 | ·73 | 5·45 | 5·79 | W.NW | |
| August ...... | 30·079 | 44·26 | 46·04 | 20·35 | 110·61 | 30·45 | 38·62 | ·79 | ·236 | 1·41 | 11 | 1·97 | 6·12 | 6·09 | NW·W | |
| September .... | 29·977 | 50.65 | 51·38 | 20·92 | 119·37 | 33·63 | 41·54 | ·71 | ·263 | 1·35 | 13 | 3·17 | 4·70 | 5·96 | W.SW | |
| October ...... | 29·894 | 54·30 | 53·50 | 26·93 | 124·03 | 33·51 | 43·34 | ·66 | ·280 | 1·45 | 14 | 4·51 | 4·83 | 5·70 | NW.W | |
| November.... | 29·976 | 56·05 | 56·50 | 20·60 | 126·73 | 39·36 | 47·76 | ·73 | ·328 | 5·05 | 21 | 1·02 | 5·73 | 6·53 | W.NW.SE | |
| December .... | 29·993 | 61·94 | 61·34 | 22·37 | 134·25 | 43·21 | 55·82 | ·80 | ·449 | 1·32 | 15 | 4·60 | 5·16 | 6·03 | NW.SE | |
| Sums ........ | 360·164 | 637·71 | 636·80 | 266·73 | 1441·35 | 424·50 | 535·83 | 9·09 | 3·532 | 19·01 | 135 | 33·57 | 71·24 | 66·65 | W.NW.SE | |
| Mean for 1879. | 360·012 | 53·14 | 53·06 | 22·24 | 120·12 | 35·37 | 44·64 | ·75 | ·294 | 1·58 | 11·25 | 2·79 | 5·93 | 5·55 | NW | |
| Mean for 1878. | 29·927 | 52·87 | 53·64 | 20·93 | 116·88 | 36·48 | 44·52 | ·74 | ·282 | 2·32 | 12·50 | 4·01 | 7·26 | 5·90 | W.SE | |
| Mean for 1877. | 30·005 | 52·71 | 52·98 | 22.03 | 118·35 | 36·02 | 44·37 | ·75 | ·297 | 1·88 | 11·66 | 4·28 | 7·91 | 5·71 | W.SE | |
| Mean for 1876. | 29·887 | 52·92 | 54·18 | 21·61 | 116·37 | 37·12 | 45·21 | ·76 | ·308 | 1·96 | 11.41 | 4·10 | 6·81 | 5·49 | W | |
| Mean for 1875. | 29·863 | 54·62 | 53·65 | 21·33 | 116·84 | 37·69 | 45·99 | ·75 | ·320 | 2·34 | 14·41 | 4·03 | 7·31 | 5·56 | W.SE | |
| Mean for 1874. | 29·912 | 54·90 | 54·33 | 18·47 | 115·50 | 40·69 | 49·31 | ·83 | ·362 | 1·92 | 11·30 | 3·55 | 7·77 | 5·95 | W.SE | |

**Total Rainfall for 1878, 27·83in. ; for 1877, 22·63in. ; for 1876, 23·54in. ; for 1875, 28·17in. ; for 1874, 23·04in.**

W. E. SHOOBRIDGE.

# REPORT

OF THE

# ROYAL SOCIETY

OF

# TASMANIA

FOR THE YEAR

1879.

Tasmania:
JAMES BARNARD, GOVERNMENT PRINTER, HOBART TOWN.

1880.

## Corresponding Members.

* Members who have contributed Papers which have been published in the Society's Transactions.

W. H. Archer, Esq., Sydney, New South Wales.
John Gould, Esq., F.R.S., London.
Sir Joseph Dalton Hooker, C.B., K.C.S.I., &c., &c., London.
*Baron F. Von Müeller, K.C.M.G., M.D., F.R.S., F.L.S., &c., Government Botanist, Melbourne, Victoria.
C. Tomlinson, Esq., F.R.S., F.C.S., &c., Highgate, near London.
*G. Bennett, Esq., M.D., F.Z.S., Sydney, New South Wales.
*G. Kreft, Esq., F.L.S., C.M.Z.S., &c., &c., Sydney.
Professor G. Neumayer, Munich.
*Rev. Julian E. T. Woods, F.L.S., F.G.S., F.R.G.S., &c.
Dr. W. O. Sonder, Foreign Hon. Sec. Society of Naturalists, Hamburg.
Rev. J. J. Bleasdale, D.D., F.G.S., Melbourne
*Captain W. V. Legge, R.A., F.Z.S., M.R.A.S., England.
Professor John Agardh, M.D., University of Lund, Sweden.
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Archibald Liversidge, Esq., F.G.S., Professor of Geology and Mineralogy in the Sydney University.
Professor W. Harkness, U.S.N., United States Naval Observatory, Washington.
Henry Haylin Hayter, Esq., Government Statist, Melbourne.
*Frederick M. Bailey, Esq., Brisbane, Queensland.
*Ralph Tate, Esq., Assoc. Lin. Soc., F.G.S., Professor of Natural History, University of Adelaide.
*John Brazier, Esq., C.M.Z.S., Sydney.
*Richard Schomburgh, Ph.D., C.M.Z.S., &c., &c., Director of Botanic Gardens, Adelaide.
Professor G. F. H. Ulrich, F.G.S., Melbourne.
Alexander Wallace, Esq., Secretary Board of Agriculture, Victoria.
*F. W. Hutton, Esq., F.G.S., C.M.Z.S., Professor of Biology, Canterbury College, Christchurch, New Zealand.
Rev. George Brown, C.M.Z.S., Sydney.
Professor F. M'Coy, F.G.S., University, Melbourne.
R. J. L. Ellery, Esq., F.R.S., F.R.A.S., &c., Government Astronomer, Melbourne.

Mons. J. N. Verschaffelt, Ghent, Belgium.
Robert Etheridge, jun., F.G.S., Geological Survey of Scotland.
James Hector, M.D., F.R.S., F.G.S., &c., Director Geological Survey of New Zealand, Wellington.
Rev. Charles Rogers, LL.D., &c., &c., Secretary Royal Historical Society, London.
E. P. Ramsay, F.L.S., &c., Curator of Australian Museum, Sydney.
Hon. W. M'Leay, F.L.S., Sydney.
William Tompson Bednall, Adelaide, South Australia.

# List of Fellows and Members.

*Fellows who have contributed Papers which have been published in the Society's Transactions. †Denotes Life Membership.

*Abbott, Francis, F.R.A.S., F.R.M.S., Hobart Town.
*Abbott, F., jun., ditto.
Adams, G. P., ditto.
*Agnew, Hon. J. W., M.D., M.L.C., Fellow of the Linnean Society of New South Wales, ditto.
Aikenhead, Hon. J., M.L.C., Launceston.
Adams, R. P., Solicitor-General, Hobart Town.
Aubin, Mrs. F., ditto.
Allport, Morton John Cecil, ditto.

Bilton, H., Glenorchy.
Barry, Sir Redmond, Melbourne.
*Barnard, James, Hobart Town.
Butler, Francis, ditto.
*Bromby, Right Rev. C. H., D.D., Lord Bishop of Tasmania, Hobart Town.
Bright, R. S., M.R.C.S., Eng., ditto.
Butler, Henry, F.R.C.S., Eng., ditto.
Buckland, H. J., ditto.
Browne, Justin M'C., ditto.
Baynton, W. E., Kingston.
Bryant, G. W., Hobart Town.
Barclay, C. J., ditto.
Bedford, W., Anstey Barton.
Belstead, C. T., Hobart Town.
Belbin, W., M.H.A., ditto.
Benjafield, H., M.B., ditto.
Browne, Hon. N. J., M.H.A., Meadow Banks, Glenora.
Bidencope, J., Hobart Town.
Butler, E. H., ditto.
Bailey, Rev. J. H. Brooke, ditto.
Barnard, C. E., M.D., &c., ditto.
Brock, H. J., Campania.
Beddome, C. E., Hillgrove, Brown's River Road.
Burgess, W. H., Mayor of Hobart Town.
Barnes, William, Launceston.

Chapman, Hon. T. D., M.L.C., New Town.
Cook, Henry, Hobart Town.
Clark, J. M., ditto.
Creswell, C. F., ditto.
*Cotton, Francis, Swanport.

Crawford, Lieut.-Colonel, Hamilton-on-Forth.
Crosby, W., Hobart Town.
Clarke, J. K., ditto.
Cruttenden, Thomas, Woodsden, Buckland.
Coote, Audley, Sandy Bay.
Cowle, Miss, Hobart Town.
Crowther, A. B., M.R.C.S. Eng., ditto.
Crosby, R., ditto.
Crowther, E. L., M.D., ditto.
Crouch, E. J., M.R.C.S. Eng., ditto.

Davies, Ven. Archdeacon, V.P., ditto.
*Dobson, His Honor Mr. Justice, ditto.
Dobson, H., ditto.
Dowdell, C., ditto.
Davies, R. L., ditto.
Dear, Rev. R. E., ditto.
Dodds, the Hon. J. S., ditto.
Dobson, Hon. Alfred, ditto.

Elliston, C. H., ditto.
Evans, T. M., ditto.

Fysh, Hon. P. O., ditto.
Freeman, E. J., ditto.

Giblin, Thomas, ditto.

*Johnson, R. M., Launceston.

Kennerley, Hon. Alfred, Hobart Town.
Kelsh, Rev. Thomas, Fingal.
Kermode, W. A., Mona Vale.

Lewis, the Hon. David, M.H.A., Hobart Town.
Legge, R. V., Cullenswood.
Lucas, R. J., Hobart Town.
Latham, G. H., ditto.
Lovett, W., Colonial Auditor, ditto.
Lord, R. W., Launceston.

Maclanachan, the Hon. James, Ballochmyle.
Macfarlane, James, Hobart Town.
Macfarlane, John, ditto.
Mather, J. B., ditto.
Maxwell, C. M., ditto.
*†Milligan, Joseph, F.L.S., England.
Marsh, H. J., ditto.
†Mace, G., Spring Bay.
Morriss, W. V., Hobart Town.
Murphy, Most Rev. D., Bishop of Hobart Town, ditto.
Macmichael, Jno. C., ditto.

Napier, G. R., ditto.
*Nowell, E. C., ditto.
Newstead, Rev. A. C., George Town.

Pillinger, J., Antill Ponds.
Perkins, H. A., M.D., M R.C.S. Eng., Hobart Town.

Roberts, H. L., ditto.
Read, R. Cartwright, Redlands, New Norfolk.
Riddoch, A., M.H.A., New Norfolk.
Roblin, T., Curator of Museum, Hobart Town.
Reynolds, W. J. J., ditto.
Richards, Rev. George B., President of Horton College, Ross.
Rex, R. R., Hobart Town.
Rawson, Rev. R., M.A., Richmond.

Seal, M., Hobart Town.
Smith, His Honor Sir Francis, Chief Justice, ditto.
†Solomon, Joseph, Hobart Town.
*Stephens, T., M.A., F.G.S., Inspector of Schools, ditto.

Story, Dr. G. F., Swanport.
Salier, F. J., Hobart Town.
*Swan, J., New Town.
Smith, P. T., England.
*Shoobridge, W. E., New Norfolk.
Shoobridge, E., ditto.
Simson, A., Launceston.
Scott, Hopton, Hobart Town.
Swan, E. D., ditto.
Sharp, J., ditto.
Shoobridge, R. W. G., New Norfolk.
Smith, C. H., Launceston.
Stone, T., Hobart Town.
Stanley, Captain, R.N., ditto.

*Travers, S. Smith, New Town.

Walch, James H. B., Hobart Town.
Weaver, W. G., ditto.
Whyte, Hon. James, ditto.
Wilson, George, Mount Seymour.
Wise, F. H., Hobart Town.
Webster, A. G., ditto.
Wright, Stephen P. H., Glenorchy.
Westbrook, G. C., Hobart Town.
Woodgate, E. W., Launceston.
Walker, James Backhouse, Hobart Town.
Wagenknicht, Albert, George's Bay.

## Obituary.

**Spicer, Rev. William Webb, M.A., F.R.M.S.**—Died at Notting Hill, London, on the 28th April, 1879. Prior to his return to England in March, 1878, Mr. Spicer had resided for some years in Tasmania. During this period he contributed some valuable papers to the Society, which appeared in the Transactions. He also published the "Handbook of Tasmanian Plants." A Fellow of the Society from 1875, he was elected a Member of the Council in 1877, and was made a Corresponding Member on his departure from the Colony. At home Mr. Spicer was a frequent contributor to publications on Natural History, and in 1869 translated and edited a work on "The Collection and Preservation of Algæ," &c. by Johann Nave.

**Langdon, William, J.P., Commander R.N., formerly Member of the Legislative Council.**—Died 23rd May, 1879, aged 90. A Fellow of the Society since 1853. A long and interesting obituary notice of Captain Langdon was published in the *Mercury* of May 26th, 1879.

**Officer, Sir Robert, Knt.**—Died at New Norfolk, 8th July, 1879, aged 79. Sir Robert arrived in the Colony in 1822, and for many years afterwards pursued a highly prosperous and successful career in the practice of medicine. During his long life he held many public appointments, and was Speaker of the House of Assembly for sixteen years before he resigned that office in 1877. As one of the founders of this Society he invariably took a peculiar interest in its welfare, and always gave it a most willing and zealous support. He was appointed a Vice-President in 1863.

**Manley, E. J.**—Died at Hobart Town, 22nd December, 1879, aged 68. A Fellow of the Society from 1876. Was also a member in 1856-7.

*MINUTES of the Annual General Meeting of the* ROYAL SOCIETY OF TASMANIA, *held at the Museum, Macquarie-street, at half-past Seven* P.M., *on Monday, 26th January,* 1880: JAMES BARNARD, *Esq., V.P., in the Chair.*

THE advertisement by which the meeting had been convened having been read, the Chairman called upon the Secretary to read the Annual Report.

The Report for 1879 was then read.

On the motion of Mr. F. Butler, seconded by Mr. Hopton Scott, the Report was adopted, and ordered to be printed for circulation amongst the Fellows.

The accounts for the year were laid on the table for the inspection of the Members.

Dr. Agnew reported that the retiring Members of Council were Messrs. F. Abbott, John Swan, Justin Browne, and A. G. Webster; and that no other nominations had been received.

It was agreed, on the motion of Mr. C. T. Belstead, seconded by Mr. F. Butler, that the four retiring Members of Council

# REPORT.

THE session of 1879 opened on the 8th April with a paper by R. Ethridge, jun., F.G.S. (of the Department of Geology, British Museum), "On the identification of the First Secondary Fossil found in Australia;" and the following papers were read at subsequent meetings:—"Description of three new Tasmanian Helices," by Lieut. C. E. Beddome, I.N.—"Notes on the discovery of *Amnicola Tasmanica*, Tenison Woods; with description of a new species of Helex," by R. M. Johnston, F.L.S.—"Notes on the discovery of *Spondylostrobus Smithii*, and other Fossil Fruits in the 'deep lead' drift at Brandy Creek, Tasmania," by the same.—"Third contribution to the Natural History of the Tertiary Marine Beds at Table Cape, with a description of 30 new species of Mollusca," by the same.—"Observations on the distribution and variability of Tasmanian Land Shells," by the same. "On recent addition to the Flora of Tasmania," by Augustus Simson, F.L.S.—"On the Codling Moth (*Carpocapsa pomonella*)," by His Honor Mr. Justice Dobson—"The Codling Moth," by F. Abbott, jun., Superintendent, Botanic Gardens.—"On some Tasmanian Trochidæ," by the Rev. J. E. Tenison Woods, F.G.S., F.L.S., &c.—"Notes on the Wild or Canadian Rice," by F. Abbott, jun.—"Notes on *Bythinella*," by the Rev. J. E. Tenison Woods, F.G.S., F.L.S., &c.—"The Codling Moth," by Augustus Simson, F.L.S.—"Notes on the relations of the Yellow Limestone (Travertin), of Geilston Bay, Hobart Town, with other fluviatile and lacustrine deposits in Tasmania and Australia," by R. M. Johnston, F.L.S.—"The Law of Storms," by the Right Rev. the Bishop of Tasmania.—"On the habits of the Platypus," by A. B. Crowther, M.R.C.S. Eng.—"On Sewage and Health," by the Right Rev. the Bishop of Tasmania.

In addition to the above-named papers, communications on the following subjects were brought forward during the Session:—"Specimens from Hicks Island, New Britain;

and from New Ireland and Duke of York Island," from the Rev. George Brown.—"Geological Specimens from Rosevere, River Tamar," from Mr. S. H. Wintle.—"The Codling Moth," from Department of Agriculture, United States.—"The destruction of Strawberry Plants by the larva of a Beetle," from Mr. Augustus Simson, F.L.S.

Meteorological Observations have been carried on, and monthly tables furnished, as usual, by Mr. F. Abbott, Mr. W. E. Shoobridge, and the Superintendents of the various Lighthouses; and the yearly abstracts are in course of compilation. The "Simultaneous Observations" are still registered by Mr. Abbott, and are forwarded by the Society, not only to America, but also to the various Government Observatories in the Australian Colonies and New Zealand.

Nine Fellows and one Corresponding Member were admitted. One Corresponding Member and three Fellows have been lost by death.

A vacancy having occurred in the list of Vice-Presidents by the death of the Hon. Sir Robert Officer, His Excellency was pleased to appoint Mr. Barnard to the office.

Gardens for weekly payment of men's wages, and arrears of subscriptions £50, will give a total of £1128 8*s*. 9*d*. The expenditure, with liabilities, as per balance sheet, amounted to £1244 3*s*. 11*d*., leaving a balance to debit of £114 15*s*. 2*d*.

## GARDENS.

The principal new work performed at the Gardens has been the laying out, forming, and planting of the Arboretum. The work in connection with this is now almost complete, and the plants are, with few exceptions, in position.

Some of the finest views from the Gardens are visible from this part, and there is no doubt it will soon become a favourite resort, especially when the trees have made sufficient growth to afford shade.

About 500 new plants, many of considerable merit, have been introduced. From seeds received from the Royal Gardens, Kew, plants of *Pithocolobium Saman* have been raised. This is a lofty shade tree, producing an abundance of sweet pods, which are eagerly devoured by cattle; the leaves fold up at night, allowing the rain and dew to fall to the ground, which favours the growth of grass beneath the trees. It is a native of South America, and probably better suited for cultivation in warm climates, but hitherto the plants have done well with us.

Special thanks are due to the donors of plants and seeds, especially to Baron Ferd. Von Müeller, Government Botanist, Victoria; Sir J. Hooker, Royal Gardens, Kew; C. Moore, Director, Botanic Gardens, Sydney; W. R. Guilfoyle, Director, Botanic Gardens, Melbourne; and the Chamber of Agriculture, Washington, United States, for their valuable donations.

The gang of prison labour supplied during the year has been of material assistance in performing the rougher work, and especially in the formation of the Arboretum, which could not have been carried out if this labour had not been supplied.

The estimated number of visitors for the year is 55,956.

## MUSEUM.

Mr. Legrand has completed the naming and arrangement of all the Tasmanian shells in our possession, and has also presented several specimens to the Museum from his private collection. Mr. C. E. Beddome has contributed several new species of land shells. Many specimens are, however, still wanting in this department, and will be added as opportunities offer.

The ornithological collection has received much attention from Mr. E. D. Swan, who has rendered most valuable service in naming the European, Indian, and many other birds, which will now, for the first time, be properly labelled. Mr. Swan has also devoted much time and trouble to relaxing and mounting a collection of dried specimens of Lepidoptera from New Britain and New Ireland, presented by the Rev. George Brown.

The cases in the Library having become inconveniently crowded, additional shelving, capable of holding about 500 volumes, has been provided. Further accommodation in this respect is, however, still required. We are much indebted to Mr. Legrand for the able and zealous assistance he has rendered in re-arranging the books generally. A really good catalogue is still an urgent desideratum, as the

of the ROYAL SOCIETY OF TASMANIA *for the Year* 1879.

| d. | £ | s. | d. |
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| 0 | | | |
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| **Expenditure.** | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Jan. 23—Balance overdrawn at Commercial Bank, as per statement for 1878 | .. | | | 143 | 4 | 3 |
| Interest on overdrawn account, 30th June, £7 11*s.* 3*d.*; 31st December, £9 9*s.* 8*d.* | .. | | | 17 | 0 | 11 |
| *Royal Society.* | | | | | | |
| Printing and Advertising | 71 | 15 | 0 | | | |
| Postage, Parcels, &c. | 4 | 13 | 0 | | | |
| Collector's Commission | 6 | 12 | 0 | | | |
| Messenger | 0 | 5 | 0 | | | |
| Furniture, Fittings, &c. | 12 | 10 | 8 | | | |
| Sundries | 0 | 5 | 0 | | | |
| Library Books, Stationery, &c. | 39 | 8 | 10 | | | |
| Clerical assistance for completing Meteorological Tables | 20 | 0 | 0 | | | |
| *Total Royal Society* | | | | 155 | 9 | 6 |
| *Museum.* | | | | | | |
| Salary of Curator | 125 | 0 | 0 | | | |
| Wages of Attendant | 52 | 0 | 0 | | | |
| Wages for Sunday duty | 13 | 0 | 0 | | | |
| Premium of Insurance | 4 | 15 | 8 | | | |
| Purchase & preparation of Specimens | 1 | 5 | 0 | | | |
| Water Rate | 5 | 13 | 4 | | | |
| Sweeping Chimneys | 0 | 12 | 0 | | | |
| Fuel and Light | 4 | 18 | 6 | | | |
| Sundries and Petty Cash | 5 | 5 | 6 | | | |
| Ironmongery, Brushware, &c. | 4 | 6 | 8 | | | |

## *BOOKS, &c. Purchased and Presented during* 1879.

[Presentations marked thus *.]

**Agricultural Gazette, The, current numbers.**
**Athenæum, The, ditto.**
**Arts, Journal of Society of, ditto.**
*** Astronomical Society, Royal, ditto.**
*** Astronomical and Meteorological Observations, 1874 and 5. From the United States Naval Observatory, Washington.**
*** Aborigines of Victoria, The, by R. Brough Smyth. From Government of Victoria.**
*** Association, Historical and Archæological of Ireland, Proceedings, Journal, &c. 1871 and 1878. From Hon. J. W. Agnew, M.D., M.L.C.**
*** Animals, On the Extinct of the Colonies of Great Britain, by Professor Owen, C.B., F.R.S., &c. From the Government of Tasmania.**

*** Bewick's British Birds, 2 vols., 1821. From Joseph Milligan, Esq., F.L.S.**
*** Bewick's British Quadrupeds, 1 vol., 1811. From the same.**
*** Bench, a Voice from the, on the abuse of intoxicating liquors. From the same.**
**Birds of Ceylon, parts 1 and 2. By Capt. R. V. Legge, R.A., F.Z.S.**
*** Brandy, Regulations for Distillation of. From United States Government.**

*** Craniorum, Thesaurus and Supplt., by Dr. J. Barnard Davis, vols. 1 and 2. From Joseph Milligan, Esq., F.L.S.**
* Charges, Two, by the Recorder, to Grand Juries at Birmingham, 1850-1. From the same.
* Cyprus, its value and importance to England. From the same.
* Conchology, Quarterly Journal of, current numbers. From the publisher.
* Catalogues, British Museum, "Cheiroptera" and "Gigantic Land Tor-

* Fig, Cultivation of the. From United States Government.

Gardener's Chronicle, current numbers.
Geological Magazine, ditto.
* Grasses of Queensland, by F. M. Bailey, F.L.S. From the author.
Grampian Club Publications:—Registers of Cupar Abbey, vol. 1; Genealogical Memoirs of John Knox; and Chartulary of the Cistercian Priory, Coldstream, by the Rev. Charles Rogers, LL.D. From the Hon. J. W. Agnew, M.D., M.L.C.
Geologists, International Congress of at Paris, 1878.

* Hydrographic Office, United States, Publications of, 1876-7. From the U.S. Government.
* Health, Questions on Public, by J. M. Tonor, M.D. From the author.
* Historical Records of Port Philip, by J. J. Shillingham. From Government of Victoria.
* Horti Petropolitani, Acta, Tome 1, fasc. 1. From the Director, Imperial Botanic Garden, St. Petersburg.

* Institute, Essex, U. S. America, Bulletin, vol. 9; Nos. 1 to 12, 1877. From the Institute.
————, New Zealand, Proceedings, vol. II., 1878.
Indians, North American, Catalogue of Photographs of.

Journal of Science, Quarterly and Monthly, current numbers.
* Jupiter, Tables of Satellites of, by D. P. Todd, B.A. From the author.
* Journal, Canadian, vol. 15, No. 6. July, 1877.
* Lincei, Accademia R. dei, Transunti, December, 1878, to July, 1879. From the Academy.

Magazine, Country Gentleman's, current numbers.
* Medical Practitioners, Queensland, 1879.
* Medical and Surgical History of the War of the Rebellion, part 2. From Surgeon Generd, U. States Army.
* ——— Education and Institutions in America.
* Museum, United States National, Bulletin, 1875 to 1877.
* ———, Colonial, Wellington, N.Z., Report, 1878-9.
* ———, Teyler, (Harlem), publications of, vol. 4, parts 2, 3, 4; vol. 5, part 1.
* Mining Surveyors and Registrars, Victoria, Reports, 1878.
* Mines, Victoria, Report of Chief Inspector, 1878.
* Microscopical Society, Royal, Journal, current numbers.
* Microscopical Petrography, by Ferd. Zirkell. Presented by the Government, United States.
* Molluscan Fauna of Tasmania, by the Rev. J. E. Tenison Woods, F.G.S., &c. From the author.
* Montana Territory, United States, Report of Reconnaisance. From U.S. Government.
* Mississippi River, Report on Physics and Hydraulics of. From ditto.
* Malakozoologischen Gesellschaft Jarbucher der Deutschen, Heft 4, 1. 10. 78.
* Meteorological Office, London, publications of; viz:—Meteorology of N. Atlantic, with Charts; Quarterly Weather Reports; Report of Permanent Committee on Vienna Congress; Meteorology of Arctic Regions, &c.
* ———— Society, Quarterly Journal of, current numbers.
* Meteorologia, Annales de la Officina Argentina, (Clima de Buenos Ayres), Tomo 1.

* Meteorology of the Bombay Presidency, with Maps. From C. Chambers, Esq., F.R.S., Supt. of Colaba Observatory, Bombay.

* Meteorological and Magnetic Observations, Government Observatory, Batavia, vols. 2 and 3, 1878. From the Director of the Observatory.

* ——— Observations, Melbourne, 1876. From R. J. L. Ellery, Esq., F.R.S.

* ———, Adelaide, 1878. From C. Todd, Esq., C.M.G., F.R.S., &c.

* ——— Department, Calcutta, Report for 1877-8; the Madras Cyclone of May, 1877. From the Government of India.

* ———, United States Daily Weather Reports, April, 1873, to April, 1874.

* Meteorology of New Zealand, 1877. From Dr. Hector, F.R.S.

* Meteorological Tables for Hobart Town, monthly. From F. Abbott, F.R.A.S., &c.

——— Mt. Nelson, South Bruni, Goose Island, Swan Island, Kent's Group, and King's Island; monthly. From the Marine Board.

Natural History, Annals of, current numbers.

Nature, ditto.

* Naturwissenschaftlichen Verein von Hamburg, Altona, Verhandlungen des, 1875-1878; Abhandlungen, 1872-6.

* Proceedings of Davenport (United States) Academy of Natural Sciences, vol. 2, part 1, 1876-7. From the academy.

* ——— American Association for the advancement of Science. From the association.

* ——— American Philosophical Society, vol. 17, No. 100. From the society.

* ——— Boston Society of Natural History, vol. 19, parts 1 and 2; and Memoirs, vol. 2, part 4, No. 6.

* ——— American Academy of Arts and Sciences, vol. 5, part 1. From the academy.

* ——— Royal Institution of Great Britain, vol. 7, parts 3 and 4;

Society, Linnean, Journal of, vol. Nos. 95-97; vol. 17, (Botany); vol. 13, Nos. 72, 73; vol. 14, Nos. 74, 75, 76. List for 1878. From the society.

———, Asiatic of Japan, Transactions, vol. 7, part 3. From the society.

———, Geological, Quarterly Journal of, vol. 24, parts 1, 2, 3, 4; vol. 25, part 1. List for 1878. From the society.

* Société Geologique de Belgique, Annales de, Tome 2, 3, (1874-5, 1875-6). From the society.

* ——— Malacologique de Belgique, Annales de la, Tome 10; Proceedings of, 1876-7. From the society.

* Society, Leeds Literary and Philosophical, Report 1878-9.

* Sugar Cane Industry, United States. From Smithsonian Institution.

* Shells, Tasmanian Land, Monograph of, by W. F. Petterd. From the author.

* Times, The, Reprint of Annual Summaries for a quarter of a century. From Dr. Milligan, F.L.S.

* Tobacco, The cultivation and curing of. From the Smithsonian Institution.

* Transactions of the Plymouth Institute, vol. 7, part 1, 1878-9.

* University, Adelaide, Calendar, 1879.

* Victorian Year Book, 1878. From the Government Statist, Victoria.

* Weeds, Naturalised, in South Australia, by R. Schomburgh, Ph. D., C.M.Z.S., &c. From the author.

* Woorali, or Urari Poison, On the. By the same.

* Wissenschaften, K. B., Akademie der Munich, publications of, 1875 to 1878. From the academy.

* Yellowstone Park, Report, 1878. From the Smithsonian Institution.

* Zoology, Bulletin of, Museum of Comparative, Harvard College, vol. 5, Nos. 11 to 14. From the Museum.

## *LIST of Donors to the Museum during* 1879.

(For particulars of Donations see Lists in Monthly Proceedings.)

Allen, Mr., Auckland, New Zealand.
Atkinson, —, Esq , Latrobe.
Allport, C., Esq., Hobart Town.
Baynton, Mr. S. J., Kingston.
Burdon, Mr., Hobart Town.
Bett, Mr., ditto.
Brown, Rev. George, New Britain.
Brazier, Mr. John, Sydney.
Boyes, W. L., George's Bay.
Cole, Mr. W., Oatlands.
Freeman, E. J., Esq., Hobart Town
Featherstone, Mr. H., Sorell.
Giblin, T., Esq.
Geeves, Mr., Franklin.
Hill, Mr. R., ditto.
Hull, Mr. H. M., Hobart Town.
Jones, J. Alun, Esq., ditto.
Johnston, A. K., Esq., North Queensland.
Jacks, Mr., Swansea.
Lewis, H. S., Esq., Geelong.
Lodder, Mrs., River Don.
Lewis, N., Esq., Hobart Town.
Lewald, Mr. D., ditto.
Long, F. H., Hobart Town.
Martin, Mrs., Bellerive.
Moore, J. A., Esq., New Norfolk.
M'Namara, Mr. M., Hobart Town.
M'Farlane, John, Esq., ditto.
M'Dowell, A., Esq., Bothwell.
M'Dowell, Rev. T., Glenorchy.
Nelson, Mr. W., Orford,
Power, G. A., Esq., Ross.
Rawson, Rev. R.
Smith, Mr., Southport.
Simson, A., Esq., George's Bay.
Shoobridge, W. E., Esq., New Norfolk
Sprent, C. P., Esq., Table Cape.
Swan, Jno., Esq., Hobart Town.
Shaw, Bernard, Esq., Launceston.
Swan, E. D., Hobart Town.
Taylor, Mr. J. A., ditto.
Thorne, Mr. F., ditto.
Wintle, Mr. S. H., George's Bay.
Whitcomb, G., Esq., Hobart Town.
Wilson, G., Esq.
Winter, Mr. A., Hobart Town.
Young, Mr. T., Margate.

## DONORS OF PLANTS AND SEEDS TO THE ROYAL SOCIETY'S GARDENS, 1879.

*February.* From Dr. Hector, Wellington Museum, New Zealand—9 packets seed.

From the Chamber of Agriculture, Washington, United States—32 packets seeds.

From Baron Von Müeller, Government Botanist, Melbourne—1 packet seed.

*March.* From the Botanic Gardens, Saharunpore, N.W. Province India—60 packets seeds.

From the Chamber of Agriculture, Washington—60 packets seeds.

*April.* From H. Hull, Esq —9 packets seeds from Philadelphia.

From Mrs. C. Meredith—10 packets seeds from Cashmere.

From Baron Von Müeller—14 packets seeds.

*May.* From J. N. Kerschaffelt, Ghent, Belgium—17 plants.

From Mr. Hugh Low, Clapton Nursery, London—Case containing 28 plants.

*June.* From Mr. Joseph Harris, Nurseryman, South Yarra, Victoria—Case containing 46 plants.

From Messrs. Shepherd & Co., Darling Nursery, Sydney—Case containing 55 plants.

From Mr. G. Brunning, Nurseryman, St. Kilda, near Melbourne—Case containing 39 plants.

From Mr. E. B. Heyne, Seedsman, Adelaide—6 plants.

From Baron Von Müeller—9 packets seeds.

From the Chamber of Agriculture, Washington—Seeds, Zizania Aquatica.

*July.* From Baron Von Müeller—36 packets seeds.

*August.* From Mr. G. Brunning, St. Kilda, Victoria—Case containing 36 plants.

From the Victorian Horticultural Society—100 varieties fruit scions.

From Ch. Huber, Seedsman, Paris—36 packets seeds.

*September.* From the Royal Gardens, Kew, near London—60 packets seeds.

From Ch. Huber, Seedsman, Paris—3 packets Primula seeds.

From Mr. S. Purchase, Paramatta, near Sydney—Case containing 36 plants.

From Mr. C. F. Creswell, Melbourne—Case containing 18 plants.

From Mr. James Jones, Melbourne—2 packets seeds.

From the Botanic Gardens, Melbourne—6 packets Palm seeds.

From Mr. Joseph Dall, Nelson, New Zealand—6 species Ferns.

*December.* From Mr. C. H. Callet, Burwood, near Sydney—Case containing 36 plants.

From Messrs. Shepherd & Co., Darling Nursery, Sydney—Case Araucaria excelsa.

From the Melbourne Botanic Gardens—Case containing 63 plants.

From Mr. J. Sangwell, Mrs. Henty's, St. Kilda Road, Melbourne—Case containing 36 plants.

From Mr. Joseph Harris, South Yarra Nurseries, near Melbourne—Case containing 45 plants.

From the Chamber of Agriculture, Washington—30 packets seeds.

## DONATIONS OF PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS, 1879.

*January.* To Mons. J. Linden, Ghent, Belgium—1 case plants.

To the Royal Gardens, Kew, near London—1 packet Eucalyptus seeds.

To the Chamber of Agriculture, Washington—1 packet seeds.

To Mons. J. Verschaffelt, Ghent, Belgium—1 packet seeds.

To Messrs. Vilmorin, Andreiu, & Co., Paris—1 packet seeds.

To Jules de Cock, Seedsman, Paris—1 packet seeds.

*February.* To Mr. Wm Bull, New Plant Merchant, London—6 Tree Ferns.

To Mons. J. N. Verschaffelt, Ghent, Belgium—4 large Tree Ferns.

To Mons. J. Linden, Ghent, Belgium—2 large Tree Ferns.

To August Van Geert, Ghent, Belgium—2 large Tree Ferns.

To Hugh Low, Clapton Nursery, London—6 Tree Ferns.

*March.* To Mons. J. N. Verschaffelt, Ghent, Belgium—6 Tree Ferns.

*May.* To Baron Von Müeller, Government Botanist, Melbourne—160 packets seeds.

To Mr. E. B. Heyne, Seedsman, Adelaide—150 packets seeds.

To Mr. James Jones, Seedsman, Melbourne—1 package seeds.

To Mr. George Brunning, St. Kilda Nurseries, Melbourne—1 case seedling plants.

To Mr. Joseph Harris, South Yarra Nurseries, near Melbourne—Case of seedling plants.

To Mr. S. Purchase, Nurseryman, Paramatta, near Sydney—Case plants and seeds.

To Messrs. Shepherd, Darling Nursery, Sydney—Case plants and seeds.

To Mr. C. F. Creswell, Seedsman, &c., Melbourne—Collection seeds.

To His Excellency F. A. Weld—Seeds for transmission to Cyprus.

*September.* To Mr. C. F. Creswell, Seedsman, Melbourne—36 Dahlias.

To Mr. James Jones, Seedsman, Melbourne—36 Dahlias.

To the Botanic Gardens, Melbourne—2 bags Sphognum Moss.

To the Botanic Gardens, Sydney—2 bags Sphognum Moss.

## PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING THE YEAR 1879.

Abutilon August Paswold
Abutilon Darwinii tassellatum
Abutilon rosæflora
Acacia spectabilis
Acer dasycarpum
Acrostichum repandum
Adiantum cardiochlœnum
Adiantum concinnum lætum
Adiantum Farleyense
Adiantum gracillimum
Adiantum macrophyllum
Adiantum Peruvianum
Adiantum Sancha Catherinæ
Adiantum trapæziforme
Agave atrovirens
Agave jaquiniana
Agave microcarpa
Agave picta
Agave striata
Agave striata vittata
Albizzia Saman
Alpinia nutans
Alisma plantago
Allantodia Australis
Ampellopsis Veitchii
Anthurium Scherzerianum
Aponogeton distachyon
Arctium edule
Areca monastachya
Aspidium aristatum
Aspidium hispidulum
Asplenium attenuatum
Asplenium cicutarium
Asplenium paleaceum
Asplenium repens
Asplenium Veitchii
Asplenium viviparum
Astartia fascicularis
Athyrium filix fœmina
Azara microphylla
Bambusa argentea striata
Bauera sessilifolia
Beaumontia grandiflora
Bœckia plicata
Begonia metallica
Berberis Lycium
Bignonia argyrea violacea
Boronia elatior
Boronia denticulata
Boronia heterophylla
Brahia filamentosa
Brachicheton rupestro
Buxus arborea variegata
Caladium argyrites
Caladium Belleymei
Caladium Festonii
Caladium Dr. Lindley
Caladium Lipley
Caltha palustris
Catalpa bignonioides speciosa
Choisya ternata
Cistus formosus
Clerodendron Balfourianum
Combretum purpureum
Conostylis albifrons
Crassula vaginata
Croton Mortii
Croton paradoxa
Croton Schomburgkii
Croton undulatum
Cupressus Lawsoniana aurea
Cupressus Lawsoniana variegata
Cupressus torulosa variegata
Cyanophyllum Bowmannii
Cyathea Cunninghami
Cycas media
Cymbidium albiflorum
Cyrtomium falcatum
Daphne hyemalis
Davallea Mooreana
Davallea plattyphilla
Davallea pixidata
Davallea Ronaldsii
Dennistadtia davalliades Youngii
Deparia Moorei
Dictyosperma alba var. rubra
Dictyogramma japonica
Dictyogramma japonica variegata
Dietes ixioides
Dieffenbachia Bausei
Dioscorea versicolor
Dipladenia Breardsleyana
Dombeya Dregiana
Doodia aspera
Doodia media
Dracæna amabilis
Dracæna Chelsonii
Dracæna fragrans
Dracæna magnifica
Echeveria Abyssinica
Echeveria atropurpurea
Elymus condensatus
Eranthemum macrophyllum
Erica ampullacea oblata
Erica Everiana superba
Erica Lowesworthi

**Erica profusa**
**Erica Regerminans**
**Erica urceolaris**
**Erica vernix coccinea**
**Erica vestita rosea**
**Erica vestita coccinea**
**Euonymus argenteus elegans**
**Euonymus elegantissimus**
**Euonymus ovatus variegatus**
**Euonymus latifolia variegata**
**Eugenia dealbata**
**Eugenia parviflora**
**Ficus vesca**
**Ficus columnaris**
**Ficus Muelleri**
**Fraxinus expansa**
**Furcroya longiva**
**Gazania splendens**
**Gleditschia Sinensis**
**Gleichenia microphylla**
**Goniopteris lineatum**
**Goniopteris pennigera**
**Goniostoma ligustrifolia**
**Grangea Sutherlandi**
**Grewia didyma**
**Grewia oppositifolia**
**Grevillea longiflora**
**Grislea tomentosa**
**Hakea dactyloides**
**Hedera arborescens albo-lutescens**
**Hedera rhombea**
**Hedera rubra argentea**
**Hedera tricolor variegata**
**Hedychium Gardneri**

**Marica cærulea**
**Menischium serratum**
**Meryta macrophylla**
**Mesembryanthemum aureum**
**Mesembryanthemum album**
**Mesembryanthemum bicolor**
**Mesembryanthemum florabundum**
**Mesembryanthemum mutabilis**
**Mesembryanthemum spectabile**
**Metrosideros scandens**
**Microlepia hirta cristata**
**Nephelium leiocarpum**
**Nephrodium extensum**
**Nephrodium melanocaulon**
**Nephrodium palmatum**
**Nephrolepis davallioides**
**Nephrolepis Duffei**
**Nephrolepis furcans**
**Nymphæa cœrulea**
**Nymphæa fimbriata**
**Olearea Armstrongii**
**Onychium japonica**
**Oreodaphne Californica**
**Ormosia emarginata**
**Pandanus Saman**
**Pandanus utilis**
**Paulinia thalictrifolia**
**Pellea falcata**
**Pellea paradoxica**
**Pentzia virgata**
**Phytolocca dioica**
**Pimelia clavata**
**Pimelia spectabilis**
**Pittosporum eugenoides aurea**

Sedum japonicum variegatum
Solanum capsicastrum variegatum
Solanum hæmatocarpum
Solanum jasminoides variegatum
Sparaxis pulcherrima
Sterculea lurida
Tacsonia tomentosa speciosa
Thuja occidentalis variegata
Todea Fraseri
Tupidanthus calyptratus
Viburnum punctatum
Vitis chantonensis
Vitis labrusca
Weigela hortensis
Weigela Lowii
Xanthozylon hastile
Xerotis Ordii
Yucca quadricolor

### *Rose.*

Countesse le Berthe
Duke of Connaught
Marie Guillot
Marie Van Houtte

### *Pelargonium.*

Aristocrat
Celeste
Claribel
Duke of Cambridge
Ethel Bead
Fairy Queen
Fanny Gair
Lady of the Lake
Leamington Lassie
M. Buchler
Mrs. Mardel
Prince of Wales
Princess Teck
Siren

### *Pelargonium.*

Zonal
Lady Suffield
Madame le Marechal M'Mahon
Prince Leopold
Prince Silver Wings
Princess of Wales
The Shah
Unique
W. E. Gumbleton

### *Fuchsia.*

Gracilis variegata
Regalia
Splendens

### *Coleus.*

Agnes Bayne
Anna Boleyn
Antagonist
Croyden
Diadem
Duchesse of Edinburgh
Gardneri
Ketleri
Mrs. Broomfield
Miss Essie
Picturata
Quadricolor
Rainbow
Sabel
Sentinel
The Queen
White Lady
Zinzibar

### *Apples.*

Barcelona Pearmain
Beauty of Hants
Brabant Bellefleur
Early Almond
Esopus Spitzbergen
Fox Whelps
Greeve's Pippin
Grey Leadington
Peasgood's Non-such
Roundway Magnum Bonum
Waltham Abbey Pearmain
Worcester Pearmain
William's Favourite
Wyken Pippin
Yellow New Town Pippin

*Pears.*

**Beurre d'Anjou**
**Beurre Hardy**
**Douchess d'Angouleme**
**Madame Treyne**
**Millet d'Nancy**
**Rousselet Infant Prodigue**
**Suffolk Thorn**

*Plums.*

**Imperatrice de Milan**
**Pourparts**
**Transparent Gage**

*Figs.*

**Agen**
**Col di Signora Nero**
**Early Violet**

*Raspberries.*

**Northumberland Fillbasket**
**October Red**
**River's Monthly**

*Strawberries.*

**Edith**
**Eleanor**
**Premier**
**Princess Alice Maud**
**Princess Frederick William**
**Princess Royal**
**Warner's Chilian**

F. ABBOTT, Jun., *Superintendent.*

# PAPERS AND PROCEEDING

AND

# REPORT,

OF THE

# ROYAL SOCIETY

OF

# TASMANIA,

FOR

# 1880.

TASMANIA:
PRINTED AT THE "MERCURY" STEAM PRESS OFFICE, HOBART.

1881.

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# Errata.

**Page 19.**—Sixth line from top, for "*Aucklandica*" read "*Aucklandicus.*"

Fourteenth line, for "*which was slowly,*" read "*which were,*" &c.

Tenth line from bottom, for "*Plesio capparis,*" read "*Plesiocapparis.*"

**Page 20.**—Twelfth line from bottom, for "*Ritzius,*" read "*Retzius.*"

Next line, for "*Sp. non.,*" read "*Sp. nov.*"

Eighth line from bottom, for "*accuminate,*" read "*acuminate.*"

**Page 21.**—Eighteenth line from top, for "*Unio trimidus,*" read "*U. tumidus,*" and for "*Ritzius,*" read "*Retzius.*"

Twenty-third line, for *accuminates*, read *acuminates.*

Twenty-sixth line, for "*Gibbosus,*" read "*gibbosus.*"

Seventh line from bottom, after Tasmania insert ; instead of ,

**Page 22.**—Second line, for *U. Pachodon*, read *U. pachodon.*

Eighth line, for "*our U. Johnstoni,*" read "*U. Johnstoni.*"

Tenth line, for *Aucklandica* read *Aucklandicus.*

Eleventh line, for *inflata* read *inflatus.*

Thirteenth line, omit *m.s.* before *species.*

Fifteenth line, for *Sandberger*, read the *Messrs. Sandberger.*

Twenty-second line, for *Genus Anodonta Cuvier*, read *Genus*

# ROYAL SOCIETY, TASMANIA.

## APRIL, 1880.

The first monthly evening meeting for the present session was held at the Museum on Tuesday, 13th April, Mr. H. J. Buckland in the chair.

Mr. Edmund P. Wilson, who had previously been nominated by the Council, was balloted for, and declared duly elected a Fellow of the Society.

The Hon. Secretary (Dr. Agnew) brought forward the usual monthly returns, viz. :—

1. Number of Visitors to Museum, March—On Sundays 921, on week days 883, total 1,804.
2. Ditto to Gardens 5,190.
3. Plants and Seeds received at Gardens :— From Chamber of Agriculture, Washington, U.S.A., 36 packets seeds. From Mr. W. R. Guilfoyle, Botanic Gardens, Melbourne, 10 packets Palm Seeds. From the Royal Gardens, Kew, two packets seeds. From Mr. C. E. Bethune, Sandy Bay, Queensland Orchids. From the Botanic Gardens, Saharanpur, N.W. India, 9 packets seeds. From Mr. Wm. Bull, London, 59 varieties Bulbs and Tubers, and 24 packets seeds.
4. Plants sent from Gardens :—To Messrs. Veitch and Co., London, 20 tree ferns. To Rev. R. H. Codrington, Norfolk Island, 36 plants. To Mr. J. Harris, South Yarra, one case plants.
5. Presentations to Museum.
6. Books and Periodicals received.
7. Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during January, February, and March, viz. :—

| | | |
|---|---|---|
| January | 6 | *Veronica angustifolia*, in full flower. |
| ,, | 7 | Apricots, commencing to ripen. |
| ,, | 10 | *Grevillea robusta*, in full flower. |
| ,, | 12 | Jargonelle Pear, commencing to ripen. |
| ,, | 14 | *Catalpa syringæfolia*, in flower. |
| ,, | 18 | Black Mulberries, commencing to ripen. |
| February | 10 | Peaches, commencing to ripen |
| ,, | 15 | Kerry Pippin Apple, ditto |
| ,, | 15 | Windsor Pear, ditto |
| ,, | 16 | Bon Chrétien Pear, ditto |
| ,, | 18 | Greengage Plum, ditto |
| ,, | 25 | Common Ash, commencing to shed seed |
| ,, | 28 | Sycamore, ditto. |
| March | 12 | Seckle Pear, commencing to ripen |
| ,, | 14 | Tips of Hornbeam, commencing to turn yellow |
| ,, | 16 | Coe's Golden Drop Plum ripe |
| ,, | 20 | Tips of Elm, turning yellow |
| ,, | 22 | Horsechestnut, leaves turning brown |
| ,, | 25 | Ash, leaves commencing to fall |
| ,, | 31 | Oak, leaves ditto. |

***Meteorology.***—

1 Hobart Town, from Mr. F. Abbott, table for January.

2. Bruni Island, tables for January and February; Mount Nelson for January, February, and March; from the Marine Board.
3. From Mr. Roblin. Abstract Tables and Results of Meteorological Observations taken at Hobart Town and the various Coast Stations during 1879, compiled from the monthly records.

The presentations to the Museum were as follows :—

1. From Mr. J. W. Rosier, Melbourne. A double-barrelled fowling-piece, formerly the property of Sir John Franklin.
2. From Mr. A. J. Taylor. A sample of Graphite from Port Sorell, with analysis.

[Although a specimen of true Graphite, the analysis shows that the specimen is practically valueless, as it contains only about 14 per cent. of carbon, whereas 60 per cent. at least should be present.]

3. From Mr. H. M. Hull. A deed signed by Governor Macquarie, dated January, 1817 (Grant of 80 Acres of Land at Glenorchy to Edward Barnes).

The following donations to the Library were brought under notice :—

"Zoologica et Palæontologica Miscellanea." By Professor R. Tate, Assoc. Lin. Soc., F.G.S. From the author.

"Lectures on the Vegetable Kingdom." By the Rev. William Woolls, Ph., F.L.S. From the author.

"On the Fertilisation of Orchids by Insects." By Charles Darwin, M.A., F.R.S., etc., etc. From Mr. E. D. Swan.

"Zoological Exercises for Students in New Zealand." By Professor F. W. Hutton, Canterbury College, Christchurch, N.Z. From the author.

"Manual of the Indigenous Grasses of New Zealand." By John Buchanan, F.L.S. From Dr. James Hector, C.M.G., F.R.S., etc.

"Prodromus of the Palæontology of Victoria." By Prof. McCoy, parts 3 to 6; and "Prodromus of the Zoology of Victoria," by the same author, parts 1 to 4. From the Government of Victoria.

A presentation, consisting of upwards of twenty volumes and [redacted]

## MAY, 1880.

The monthly evening meeting of the Society was held on Tuesday, May 11. Mr. T. Stephens, M.A., F.G.S., in the chair.

The Hon. Secretary, DR. AGNEW, brought forward the usual returns for the past month, viz:—

1. Number of visitors to Museum—On Sundays, 891—On weekdays, 708. Total, 1,599.
2. Number of visitors to Gardens. Total, 4,229.
3. Plants sent from Gardens—To Mr. T. Smith, Riddel's Creek, Victoria, 60 plants—To Mr. T. Sangwell, at Mr. Henty's, St. Kilda Road, Victoria, 40 plants—To the Botanic Gardens, Sydney, 80 plants—To the Botanic Gardens, Melbourne, 78 plants.
4. Books and periodicals received.
5. Presentations to Museum.

*Meteorology:—*

From the Marine Board, tables from Mount Nelson for April, Swan Island and South Bruni for March.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during April:—

12th. Chinese chrysanthemums, commencing to flower.
19th. Elm leaves, commencing to fall.
10th. Coe's late plum, ripe.
20th. *Pyrus aucuparia*, leaves falling.
29th. Seeds of hornbeam, ripe.

The presentations to the Museum were as follows:—

1. From Mr. W. Aldred:—Sternum of a species of "Moa," from the Spear Grass gold diggings, Otago, New Zealand. [This bone was brought by Mr. Aldred from the locality in which it was found, and is of interest, from being so rarely found as compared with other portions of the skeletons of these gigantic birds.]
2. From the same:—A small Jade Axe, from Mr. Chappel's farm, Ophir, Otago, N.Z.
3. From Mr. G. Powling:—A White Hawk (*Leucospiza Novæ Hollandiæ*).
4. From Mr. F. Abbott, jun.:—A Rose-breasted Cockatoo (*Cacatua roseicapilla*).

The SECRETARY read a paper entitled "Description of a New Species of Helix found in a Calcareous Sandstone Deposit at Kent's Group," by R. M. Johnston, F.L.S.

A communication from the Rev. E. P. Adams, on the composition of the Nucleus of Comets, was also read.

The meeting closed with a vote of thanks to the authors of the papers read, and the donors of presentations.

## JUNE, 1880.

The monthly evening meeting of the Society was held on Tuesday, 8th June. Mr. C. H. Grant in the chair.

The Secretary (Dr. Agnew) brought forward the usual returns for the past month, viz.:—

1. No. of Visitors to Museum—On Sundays, 794; on week days, 682; total, 1,476.
2. Ditto to Gardens, 3,067.
3. Books and Periodicals received.
4. Presentations to Museum.

*Meteorological Returns.*—

From the Marine Board. Tables from Mount Nelson for May, and South Bruni Lighthouse for April.

Return showing time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during May:—

12th. First Medlar (Nottingham), ripe.
18th. *Photinia serrulata*, commencing to flower.
20th. *Diosma alba*, ditto.
28th. *Spiræa prunifolia*, ditto.
29th. *Aïlanthus glandulosa*, leaves all shed.

F. Abbott, Jun., Supt.

The presentations to the Museum were as follows:—

1. From Mr. James Mackey.—Two specimens of the so-called "Vegetable Caterpillar" *(Cordiceps Robertsii)*, from New Zealand.
2. From Mr. McShane, Jerusalem.—The cast skin of a large Black Snake *(Hoplocephalus curtus)*.
3. From Hon. James Maclanachan, Tunbridge.—An Egyptian Goose *(Chenalopex Egyptiaca)*.
4. From Mr. J. C. Bethune, Dunrobin.—Specimen of Native Tiger *(Thylacinus cynocephalus)*.
5. From Miss Wickes, Cherry Tree Opening.—A piece of the outer bark of the White Gum with curious markings resembling lace-

in New Zealand, where, however, it may have been overlooked, as it has been for so long a time in Tasmania."

After some conversational discussion the proceedings were closed by a vote of thanks to Baron von Mueller, and to the donors of presentations.

No Meeting held in July.

## AUGUST, 1880.

The monthly evening meeting of the Society was held on Monday, the 9th August, Mr. James Barnard, V.P., in the chair.

Mr. William Gordon Maddox, M.R.C.S., Eng., and Mr. William Mason, M.R C.S., Eng., who had previously been nominated by the Council, were balloted for, and declared duly elected as Fellows of the Society.

The hon. secretary, Dr. AGNEW, brought forward the usual returns, viz.:—

1. No. of visitors to Gardens during June, 3,400; July, 3,880.
2. Plants and seeds sent from Gardens.
3. No. of visitors to Museum, June, on Sundays, 938; on week days, 993; total, 1,931. July, on Sundays, 789; on week days, 1,046; total, 1,835.
4. Books and periodicals received.
5. Presentations to Museum.

Meteorological tables, from the Marine Board, Bruni Island, for May; Mt. Nelson, for June and July.

Times of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens, during June and July, 1880:—

June 10. *Iris alata* in flower.
20. *Maclaura aurantiaca* shedding seed.
22. Privet shedding leaves.
24. *Lachanalia rosea* in flower.
28. *Calycanthus præcox* do.
30. *Pyrus japonica* commencing to flower.
,, *Crocus vernus* in full flower.
July 8. *Arbutus unedo* commencing to flower.
10. *Garrya elliptica* do.
18. White mulberry commencing to break.
20. Almond commencing to break.
21. *Cytisus leucanthus* commencing to flower.
30. Yellow crocus do.

The presentations to the Museum were as follows:—

1. From C. E. Barnard, Esq., M.D.—A collection of Fossils and

The following presentations to the Library were specially brought under notice, viz.:—

1. Proceedings of the Linnean Society of New South Wales, vol. 4, part 4; from Mr. E. P. Ramsay, F.L.S., etc.
2. "Synonymy of, and Remarks upon Port Jackson, New Caledonian, and other Shells." By John Brazier, C.M.Z.S., from the Author.
3. "The eleventh Annual Report of the American Museum of Natural History," New York. From the Trustees. [Attention was directed to the photographs by which this report is illustrated, which convey a grand idea of the large and liberal scale on which the Museum has been founded; and also indicate the lines on which its future great extension will be carried out.]

The following extract from a letter from Dr. Dennys, Curator of the Raffles Museum, Singapore, was read:—"I take, however, great interest in the science of conchology, and am most anxious to complete my collection by all available means. I can exchange local species for Australian or Tasmanian, having not a single shell from either locality (except *Phos senticosus* from N. Australia). At present I have about 500 species, almost exclusively Malayan and Philippine. I have promises, however, from Mauritius, Zanzibar, China, etc, and may be able to offer you a fair *quid pro quo.* Being Curator of our local Museum, I have many opportunities of obtaining articles which might be welcome in your part of the world; kindly state what you most want. Our mammals are not very numerous, and are expensive, a dead tiger commanding 50dol., or roughly £10. Of reptiles I could send a good collection, as also of local birds. I should like four specimens at least of every shell (*i.e.* two for the Museum, and two for myself) you can obtain. If you could send me a list of the Malayan shells you have, I should know what you would require."

A letter from Mr. Charles Gould, dated Singapore, recommending Dr. Dennys' application, and suggesting that specimens of the following minerals, etc., might be presented to the Raffles Museum, was also read:—1. Quartz with gold; 2. Tin ore, from Mount Bischoff, in masses and in sand; 3. Bismuth, from Mount Ramsay; 4. Topazes, from Flinders Island; 5. Red hæmatite; 6. Brown do., from Ilfracombe; 7. Manganese ores, from West Coast; 8. Rutile, from do.

The following papers were then read:—

1. "On Queensland Lichens." By. F. M. Bailey, F.L.S., and Rev. J. E. Tenison-Woods, F.G.S., F.L.S.
2. "Notes on a collection of Fossil Fruits from the 'Black Lead,' Gulgong, New South Wales." By C. E. Barnard, M.D.

The proceedings closed with a vote of thanks to the authors of the papers read, and to the donors of the various presentations.

## SEPTEMBER, 1880.

The monthly evening meeting of the Society, which was very numerously attended, was held at the Museum on Monday, the 13th September; His Honor Mr. Justice Dobson, V.P., in the chair.

Mr. V. W. Hookey, who had previously been nominated by the council, was balloted for, and declared duly elected as a Fellow of the Society.

The hon. Secretary, Dr. Agnew, brought forward the following returns, etc., received since last meeting:—

1. Number of visitors to Museum during August—on Sundays, 1,206; on week days, 514; total, 1,720.
2. Do., to Gardens; total, 4,516.
3. Plants, etc., received at Gardens:—From Mr. J. Brown, six Plants of *Alsophila excelsa*. From the Acclimatisation Society of Queensland, one case of seedling Coniferæ. From the Victorian Horticultural Society, a collection of Fruit Scions. From Mr. Jno. Smith, Riddel's Creek, Victoria, one bundle of Plants and Scions.
4. Plants, etc., sent from Gardens:—To Botanic Gardens, Sydney, two bags of Sphagnum Moss. To the Launceston Corporation, 250 Plants for public places. For Main Line Railway reserve, Hobart, 12 Plants. For planting ground at Macquarie-street, entrance to Domain, 60 Plants.
5. Books and Periodicals received.
6. Presentations to Museum.

*Meteorology.*—

1. New Norfolk, from Mr. W. E. Shoobridge.—Abstract tables, from April to August inclusive.
2. From the Hobart Marine Board.—Tables from Mount Nelson for August; Kent's Group, February to June; Bruni Island for July; Swan Island, April to June; and Cape Wickham, King's Island, February to June.

Time of leafing and flowering of a few standard plants in the Botanic Gardens during August:—

20th. *Sambucus niger* commencing to break.

Mallee Snake, it has often been described to me as a formidable creature, of at least 30ft. in length, which confined itself to the mallee scrub. No one, however, has ever seen one, for the simple reason that to see it is to die, so fierce it is, and so great its powers of destruction. Like the 'Bunyip,' I believe the 'Mindi' to be a myth—a mere tradition."

The SECRETARY informed the meeting that a fragment of a paper, by the late Mr. T. G. Gregson, on the habits and manners of the Tasmanian Aborigines, had been placed in his hands for perusal. The first portion of the paper referred particularly to the general treatment of the natives by the white population, but as that subject was fully treated of in "West's History of Tasmania," it could be of little interest to the meeting; the remaining portion, however, giving Mr. Gregson's impressions from personal observation of the Aborigines, was, he thought, of sufficient interest to warrant its being read. The paper was then read.

A paper by the Rev. J. E. Tenison-Woods, F.L S , etc., "On some introduced Plants of Australia and Tasmania," was also read by the SECRETARY. The paper gave a long and most interesting account of the introduction and acclimatisation of about 35 plants, including the Bathurst Burr, common Nettle, several varieties of Thistle, Fumitory, Verbena, etc., etc.

Captain STANLEY, R.N., read a valuable paper on "Oyster and other Fisheries."

Discussion took place on various matters connected with oyster fisheries, and a general expression of feeling was given to the effect that, seeing our native oyster beds were being rapidly destroyed, some prompt and decided action should be taken for the purpose of preserving them, and of turning their produce to a profitable account, in the interest both of the State and of the community.

A cordial vote of thanks to the authors of papers, and to the donors of presentations, closed the proceedings.

## OCTOBER, 1880.

The monthly evening meeting of the society was held on Monday, the 11th October; His Honor Mr. Justice Dobson, vice-president, in the chair.

Robert Henry, jun., Esq., Superintendent of Telegraphs, who had been previously nominated by the Council, was balloted for, and declared duly elected a Fellow of the Society.

The hon. Secretary, Dr. AGNEW, drew attention to the following returns, received since last meeting, viz.:—

1. Number of visitors to Museum during September: On Sundays, 1,057; on week days, 907; total, 1,964.
2. Ditto to Gardens, 3,996.
3. Books and periodicals received.

*Meteorological Returns—*

1. From the Marine Board: Tables from Swan Island, for July and August; Mount Nelson, for September.
2. From R. L. J. Ellery, Esq., F.R.S.: Monthly records of observations made at the Melbourne Observatory during March and April.

Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during September:—

18th. Moutan Peony commencing to flower.
20th. Horsechestnut ditto.
21st. *Quercus pedunculata* commencing to break.
27th. Ash commencing to break leaf.
28th. Sycamore ditto.
30th. *Robinia pseudo-acacia* commencing to leaf.
30th. *Platanus occidentalis* ditto.

F. ABBOTT, Jun.,
Superintendent.

The SECRETARY reminded the meeting that Mr. Charles Gould, then a resident member, read a paper about eight years ago, before the society, "On the existence of large animals (probably seals) in the upland lakes of Tasmania," and connected the possible existence of [redacted] the Perch family as *Dules ambiguus.** It is doubtful whether the fish now under notice may not have to be placed under a new genus. Its general characters are as follows:—B.6, D. $\frac{9}{9\text{-}10}$. A.3/8, P.13; L. tran. 7/16, L. lat. 52; V.1/5; and therefore, according to Dr. Gunther, it cannot be included within the genus *Dules*, because he has based his genera principally upon the number of spines in the dorsal fin. It may more properly belong to the genus *Gerres*, of the family *Pristipomatidœ.* It is possible, however, that the spines of the dorsal, as in *Latris*, are not constant. It would therefore be necessary to examine more specimens before it could be properly classified.

Mr. R. M. JOHNSTON, F.L.S., read the two following papers:—The first, by himself, entitled "A description of two new species of fish" (*Trachichthys Macleayi*, and *Mendosoma Allporti*), caught in the estuary of the Derwent. The second, by the Rev. J. E. Tenison-Woods, F.L.S., F.G.S., etc., entitled "Introductory Notes to the Natural History of Tasmania."

The latter paper gave a most valuable synopsis of the leading features of the Tasmanian flora and fauna. Comparisons were made with corresponding features in the neighbouring colonies and elsewhere, which led to much interesting speculation. It was explained that this was the forerunner of a series of similar short papers or catalogues relating to the various specific branches of the natural history of Tasmania, to be undertaken by Mr. Woods in conjunction with several local naturalists, who are making the particular branches their special study.

Interesting discussion followed the reading of Mr. Wood's paper, in which His Honor Mr. Justice Dobson, Mr. C. H. Grant, Mr. Barnard, Mr. Johnston, and others took part. It was suggested that great care should be taken in drawing conclusions between two different provinces whose particular branches of natural history were unequally investigated. Unqualified comparisons between two districts, whose particular branches of natural history were imperfectly investigated, would be misloading. It would also lead to confusion if either of these districts was compared with one where any of those branches had been fully worked out.

The meeting closed with the usual vote of thanks to the authors of the papers read.

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*Dr. Gunther describes L. lat. 85. This is an error, as Dr. Richardson in the original description states it as L. lat. 52.

[illegible]

## *ALGÆ* OF THE NEW HEBRIDES,

Christmas, 1879.

Herewith, dear Dr. Agnew, I send you a list of 23 Algæ, which were examined from a small collection, made by Mr. F. Campbell, on my request, during his stay in the New Hebrides. The elaboration of these oceanic plants, the first recorded from that group, is by Dr. W. O. Sonder, who since fully 40 years has been an eminent author on this tribe of vegetation, who still makes phycology a favourite study, and who can bring an almost unrivalled experience to bear on the elucidation of seaweeds. As Dr. Sonder is an honorary member of the Tasmanian Royal Society, I have thought it but right to offer these notes of his preferentially to your journal.

Regardfully yours,
FRED. VON MUELLER.

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## *ALGÆ* OF THE NEW HEBRIDES,

COLLECTED BY F. CAMPBELL, ESQ., AND EXAMINED BY
DR. W. O. SONDER, OF HAMBURG,
Hon. Memb. Roy. Soc. Tasm.

[*Read* 13*th April*, 1880.]

1. *Turbinaria ornata*, J. Agardh. Spec. Algarum i., p. 267.
2. *Turbinaria vulgaris*, J. Ag. l.c.
3. *Sargassum gracile*, J. Ag. l.c., p. 310.
4. *Sargassum polycystum*, *S. onustum*, J. Ag. l.c., p. 311.
5. *Asperococcus sinuosus*, Bory. J. Ag. l.c., p. 75.
6. *Laurencia papillosa*, Grev. Syn. Alg., p. 52, forma minor, papillis brevissimus.
7. *Laurencia nidifica*, J. Ag. l.c. ii. 3, p. 749.
8. *Mastophara foliacea*, Kütz, Tab. phyc., vol. viii. t. 100.
9. *Sarcodia ciliata*, Zanardini, Phyc. Austr. nov. n. 19.
10. *Sarcodia polyclada*, Sond. spec. nova. S. fronde crassiuscula, carnoso-membranacea, a stipite brevissimo plano oblonga, margine prolifera, prolificationibus e bassi cuneata dichotomis vel irregulariter ramosis, segmentis ultimis teretiusculis simplicibus vel furcatis.

Specimen circ. 3 pollicare, discus 1 poll. longus et 3 poll. latus, segmenta ultima circ. 3-4 linearia. Fructus ignoti. Structura interna generis. Color obscure purpureus. A. S. palmata ramificatione facile distinguitur.

11. *Gracilaria lichenoides*, J. Ag. l.c., p. 588.
12. *Gelidium rigidum*, Grev., J. Ag. l.c., p. 468.
13. *Hypnea pannosa*, J. Ag. l.c., p. 453.

14. *Galaxaura rugosa*, Lamx., Kütz, tab. phyc., vol. viii. t. 33.

15. *Plocamium hamatum*, J. Ag. Epicrisis syst. Florid., p. 338. Frons superne densius ramosa, pinnis alterne ternis. Pinnarum infima subulato-acuminata, erecto-patula, sæpius recurvato-uncinata, dorso incrassato subdenticulata. Sporophylla in axilla fasciculata subsessilia vel secus interiorem pinnulæ marginem seriata, in pedicellis solitaria, sæpius aggregata, ovalia vel oblonga et magis minusve arcuata. Sphærosporæ duplice serie dispositæ.

16. *Centroceras clavalatum*, Montague. Flor. Alg. 140 var. cryptacanthum, C. cryptacanthum, Kütz, tab. phycal. vol. iii. t. 17.

17. *Caulerpa Novo-Ebudarum*, Sond. et Muell. C. frondibus e surculo repente teretiusculo glabro erectis filiformibus dichotomis basi compressis et margine denticulatis, mox spiræ modo intortis 3-4-fariam denticulatis, denticulis conicis mucronulatis.

Species C. serrulatæ et Freycineti affinis, tenuitate ab omnibus distincta. Frondes 3-4 pollicares, uti surculus $\frac{1}{3}$ lin. latæ. Rami erecti.

18. *Caulerpa Freycinetii*, Ag. Spec. Alg., p. 446, Kütz. tab. phyc. vol. viii. t. 4 c.

19. *Caulerpa Campbelliana*, Sond., spec. nova, C. frondibus a surculo tenui repente glabro erectis, supra stipitem teretiusculum sensim cuneato-dilatatis planis lineari-lanceolatis pinnatifidis simplicibus rarius parce dichotomis vel ex apice proliferis, lobis alternis in basi frondis remotis versus apicem approximatis erectis vel subadpressis e basi latiore longe acuminatis mucronulatis.

# ON SOME AUSTRALIAN SLUGS, CHIEFLY TASMANIAN.

BY PROFESSOR RALPH TATE, Assoc. Lin. Soc., F.G.S., etc., President Phil. Soc. Adelaide, Honorary Member Royal Society of Tasmania.

[*Read 13th April,* 1880.]

Slugs have long been known to inhabit various parts of the Australian colonies, and their existence is, year by year, becoming more and more unpleasantly familiar to the gardener and floriculturist. The naturalist has, however, paid little attention to them.

The scientifically-known Australasian Slugs belong to two different families. 1st. The *Limacidæ*, which includes *Limax olivaceus*, Gould, described in 1852 (see "Otia," p. 223), from specimens obtained at Parramatta, New South Wales; and the New Zealand *Milax antipodarum*, Pfeiffer, and *Limax fuliginosus*, Gould (l. cit., p. 223). The last has been overlooked by Hutton, Cat. Land Moll. of New Zealand, 1873, and by Von. Marten's Critical List of Moll. of N. Z., 1873, but it is congeneric with *Milax antipodarum*, and may probably prove to be specifically identical. 2nd. The *Janellidæ*, which comprises the bitentaculated Slugs, is restricted to the Australasian province, and includes the following types:—*Janella bitentaculata*, Quoy and Gaimard (*Limax*), of New Zealand; *Aneita MacDonaldi*, Gray, of New Hebrides; and *Triboniophorus Græffi*, Humbert (Memories de la Soc. de Physique, etc., de Geneve, vol. xvii., 1st part, 1863), from Woollongong, New South Wales. Similar forms occur in New Caledonia. (Fischer, Journ. de Conchyliologie xvi., p. 228-232, 1868), but it is doubtful if more than one generic form is represented. *Triboniophorus* differs from the other genera of the family by the absence of a dorsal groove.

The common Tasmanian and South Australian Slugs belong to the first-named family, and to the Old World genera, *Limax* and *Milax;* but a new genus, *Cystopelta*, I have erected for the reception of a rarer Tasmanian form, which may be relegated to the family *Arionid*. To Messrs. Petterd and Legrand I am indebted for the material forming the basis of this communication, and from whose observations it would appear that *Limax Legrandi* and *Milax Tasmanicus* are widely spread in Tasmania; but the chief interest attached to *Cystopelta Petterdi*, which has been forwarded to me by the gentleman whose name it bears. Both gentlemen have also submitted to me the large Slug inhabiting cellars and gardens about Hobart and Launceston,—this is the European *Limax cinereus,* and which is also well established about Adelaide. The question arises, may not *Milax Tasmanicus* and *M. nigricolus* be conspecific with *M. gagates* of the South of Europe? but they both present the peculiarity of a smooth shield; and as regards *M. nigricola,* its distribution favours the opinion that it is indigenous.

LIMAX LEGRANDI, nov. sp.

Body elongated, slender, about one inch; shield long and narrow, reddish-brown to pale yellowish-gray, marbled with darker colour (reddish-brown to dark-brown); hinder part of body with dark reticulations on a yellowish-white spotted ground.

Back of neck similarly coloured to shield; under side of foot gray, inconspicuously longitudinally three-banded; respiratory orifice post median.

Shell small, elongate-ovate, concave within, mandible yellow to dark-horn, rostrated, and finely transversely striated.

Lingual ribbon and teeth as in *Milax Tasmanicus.* Locality, Hobart (W. Legrand) and Launceston (F. Petterd).

MILAX TASMANICUS, nov. sp.

An elongated Slug of a blackish colour, keeled from the end of the small mantle; body smooth, slender, hind part carinated, colour grey-brown, with black stripes diverging from the shield; sides lighter in colour, of a general steel-blue, minutely spotted with white.

Shield small, black smudged on a greyish-brown coloured ground, free to the respiratory orifice, which is post median, marked with a rhomboidal dark band conformable with the

Localities :—Launceston (W. F. Petterd) and Hobart (W. Legrand.

**MILAX NIGRICOLUS**, nov. sp.

Resembles *M. Tasmanicus*, but is less robust, and the surface is not so much wrinkled.

General colour black, with bluish-black sides;, head bluish-black; under side of foot grey; upper tentacles bluish-black, short; neck black, with two median longitudinal grooves.

Shield elongate-oval, deep black, shagreened, with a rhomboidal commissure on hinder part; body carinated from the shield; back with diverging grooves from the shield, granulated between; respiratory orifice, post median; penis, strap-shaped, a little behind front edge of the shield, spirally coiled. Length, 1¼ inches.

Locality :—Inhabits the gullies of the Adelaide hills, and is widely dispersed over the Adelaide Plain.

**CYSTOPELTA**, nov. gen.

Derivation, in allusion to the inflated or bladder-like shield; animal slug-like; body attached for half its length to the back of the foot; mantle very large, enveloping the whole animal in repose, but from beneath which the head and the tip of the tail alone are visible from above, when the animal is crawling; tentacles, four; tail with a mucous pore at the tip; mandible like that of *Arion*; lingual teeth resembling those of *Testacella*.

**CYSTOPELTA PETTERDI**, nov. sp.

Animal elongated, somewhat slender; mantle rather of a leathery consistency, very large, dilated behind, and projecting laterally, so as to cover the whole animal excepting the end of the foot, and the head as far as the tentacles; surface smooth, or minutely wrinkled all over; brown, or blackish-brown, sprinkled with whitish and blackish minute spots, darker towards the posterior margin; free as far as the pulmonary orifice, which is situated at about one-third the length of the shield from the front margin. No shell.

Foot narrow, strap-shaped, tapering posteriorly, perpendicularly sulcated on the sides, and margined by a groove above. It is of a similar colour to that of the shield, but the part exserted beyond the mantle is marked with black lines *en chevrons* on a white spotted ground. Mucus colourless.

Tentacles, four, the upper five millimetres long, minutely granular at the base, and becoming smooth towards the apex, which is black; lower pair, two millimetres long, pale in colour.

Penis cylindrical, stout, long, and slightly dilated at the end, situated in a line with the upper tentacle on the right side.

Mandible crescent-shaped, not rostrated, vertically grooved and interstriated, denticulated on the margin.

Lingual ribbon of 96 rows of an infinite number of similar lanceolate teeth.

Dimensions:—Total length when crawling (without tentacles), 30 millimetres; total width when crawling, 9 millimetres. (Measures made by Mr. Petterd.)

Locality:—Near Launceston (W. F. Petterd); Southport (B. R. Dyer).

## A CONTRIBUTION TO OUR KNOWLEDGE OF THE *UNIONIDÆ* OF THE LAUNCESTON TERTIARY BASIN.

enquiry, the shell named, but not described by Prof. McCoy as *Unio Dacombii*,[*] from the Wannon Secondary beds of Victoria, the first detailed notice we appear to have of *Unio* in Tertiary or Post Tertiary formations, is the description by Capt. F. W. Hutton[†] of two New Zealand species, *U. Aucklandica*, Gray, from the coal formation of Dunstan, Otago, and *U. inflata*, Hutton, from the Ototara group of Morley Creek, Southland. In a very instructive and able paper on "The composition and extent of certain Tertiary beds in and around Launceston," Mr. R. M. Johnston[‡] has given many facts which have a direct bearing on the subject under discussion. He has shown that previous to the later volcanic period the valley of the Tamar was occupied, to a great extent, by a large lake, in which was slowly deposited beds of lignite, with laminated clays and sands, denominated by him the Launceston Series, and containing the remains of an extensive flora. The Launceston Series is divided by Mr. Johnston into three zones, from the lower of which specimens of a *Unio* have been obtained at Muddy Creek, on the W. Tamar. The size of this lake is computed to have occupied "not less than 600 miles of what now is the most fertile and cultivated portion of the Island of Tasmania."[||]

The next mention we have of the occurrence of the genus *Unio* in Australasian Tertiary beds is that by my friend and former colleague, Mr. C. S. Wilkinson, F.G.S., Government Geologist for N. S. Wales. In his "Report of Progress for the year 1876," Mr. Wilkinson places on record that "In the Home Rule Lead (Gulgong), at a depth of 126 feet, a fossil *Unio* was found associated with the vegetable fossils. The discovery is interesting, inasmuch as this is the first fossil shell of the kind yet found in the Pliocene Tertiary gold drifts."[§] The plants referred to by Mr. Wilkinson are *Spondylostrobus*, *Plesio capparis*, and others characteristic of the Victorian and N. S. Wales gold leads, described by Sir Ferdinand von Mueller. The *Unio*, although a unique specimen, was forwarded to me by Mr. Wilkinson for description. After comparing it with the fine collection of recent *Unionidæ* in the British Museum, I came to the conclusion that, taking into consideration the state of preservation of the fossil, it agreed sufficiently well with the New Zealand *U. Aucklandicus*, Gray, to be regarded only as a variety of that species. A description, under the name of *U. Auck-*

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[*] In Smyth's Progress Rep. Geol. Survey Vict., 1874, pp. 24 and 35.

[†] Cat. Tert. Moll. and Echinodermata of N. Zealand, 1873, p. 25.

[‡] Papers and Proc. R. Soc. Tas. for 1878, pp. 39-47.

[||] Loc. cit. for 1874, p. 58.

[§] Annual Rep. Department of Mines, N. S. Wales, for 1876, p. 172.

*landicus*, var *Wilkinsoni*, has been accordingly forwarded to Sydney for publication. So far as I am aware, the above extracts give an outline of all that has been written on the subject of fossil *Unionidæ* in Australasia, although I should imagine, from the widespread nature of certain Post-Tertiary deposits over the continent of Eastern Australia, containing the remains of *Diprotodon*, gigantic kangaroos, and other extinct mammals, associated with fluviatile and brackish water mollusca, that shells of the *Unionidæ* will likewise be met with.

To return to the *Unios* from the Tamar River. Specimens first came under my notice in a collection of Tasmanian fossils, presented to the British Museum by Dr. Milligan, and being, so far as I could ascertain, not directly noticed, I wrote on the subject to my friend Mr. R. M. Johnston, who has kindly supplied me with the following facts:—[‡] "Specimens of the *Unio* sp. of the 'Launceston Tertiary Basin,' which has not yet been described . . . . . are now for the most part in a state of 'brown hematite,' matrix a ferruginous clay, associated with leaves described by me in my first paper on the Launceston Tertiary Basin. . . . . I could never get a glimpse of the hinge teeth. It, perhaps, may be identical with your *U. Wilkinsoni*, which I have never seen."

Dr. Milligan's specimens quite bear out Mr. Johnston's description of their conversion into brown hematite, and so far has this alteration proceeded, that it is with difficulty the more detailed characters of the species can be distinguished. Amongst Dr. Milligan's specimens there are undoubtedly gradually flattening towards the pointed posterior end; diagonal ridge inconspicuous, rounded; posterior slope, small; umbones large, broad, becoming somewhat flattened by decortication; shell substance moderately thick; surface coarse and rough on the anterior end, with strong, prominent, concentric lines of growth, which gradually flatten out into laminæ on the posterior end; bent upwards at the rounded diagonal ridge; no sign of radiatory lines; dental and muscular characters unknown. Length, 3 in. 10 lines; breadth, 2 in.; depth of the united valves, 1 in. 10 lines.

*Obs.*—The condition of the specimens, both in this and the succeeding species, renders it very difficult to give some of the characters with accuracy. This is especially the case with the surface ornament, which becomes much obliterated.

I have carefully compared these shells with the fine collection of recent *Unionidæ* in the British Museum, and cannot suggest any species with which they may be compared, unless it is *Unio trimidus*, Ritzius.

There are many produced species of *Unio*, such as *U. Buddianus*, Lea; *U. Shepardianus*, Lea; or *U. rectus*. Lamk.; but with neither of these are there characters in common. In the massive convex form our species approaches *Unio Anodontoides*, Lea, from Alabama, but accuminates posteriorly too rapidly, and has not the ventral sinuation of that species. Similarly, it is too convex on the anterior side of the shell for *U. Gibbosus*, Burns, a North American form, and does not possess the well-marked diagonal ridge of the latter.

*U. Johnstoni* does not resemble any of the living Australian species with which I am acquainted, but approaches nearest to *U. mutabilis*, Lea, which is found around Brisbane, although the resemblance here is of a slight character. According to the most recent investigations amongst the land and freshwater shells of Tasmania, by the Rev. J. E. T. Woods* and Mr. R. M. Johnston,† only one species of *Unio* is still known to exist there. Both these authors quote *U. Moretonicus*, Sow., as occurring in the northern rivers of Tasmania, and a comparison of this with *Unio Johnstoni* is unnecessary, the dissimilarity between the two shells is so great; but here arises the interesting fact that Tasmania, at the present day, should possess only one species of *Unio*, whilst in Tertiary times it is possible that several existed.

I have not been able to meet with any described fossil *Unio* with which the present species need be compared.

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* On the Freshwater Shells of Tasmania *(Papers and Proc. R. Soc. Tas.)*, 1875, 8vo., p. 17.

† Further Notes on the Freshwater Shells of Tasmania *(Papers and Proc. R. Soc. Tas.)*, 1877, 8vo., p. 11.

There is a certain resemblance between *U. Johnstoni* and *U. Pachyodon*, Ludwig[*] (from the Tertiary strata of Oppenheim, on the Rhine), when viewed from the side, but the compressed form of the valves at once separates our shell from this species. Several species of *Unio* have been described from the Wahsatch group of the Wyoming Tertiary strata, by Dr. C. A. White,[†] but none of them appear to correspond with our *U. Johnstoni.*

Of the two species described from New Zealand strata, neither will correspond with our form. One, *U. Aucklandica*, is oblong and compressed; the other, *U. inflata*, Hutton, is oval and ventricose; lastly, *U. Johnstoni*, is quite distinct from my m.s. species, *U. Wilkinsoni*, of the Gulgong deep leads.

Sandberger figure a number of fossil *Unios* in their "Susswasser Conchylien," none of which need be compared with the Tasmanian specimens.

*Loc. and horizon*—In a ferruginous clay, Tertiary beds of the Tamar River, between Whirlpool reach and George Town, Tasmania (*British Museum*, Milligan Collection, Reg. No. 9628); Muddy Creek, West Tamar (*R. M. Johnston*).

### Genus Anodonta Cuvier.

Anodonta (?) Tamarensis. *Sp. nov.* Fig. 3 and 4. *Sp. chars.* — Shell transversely-obliquely-oval, generally compressed, in marginal outline obliquely hatchet-shaped; anterior and posterior ends compressed, sharp at the margins; anterior outline (margin) rounded; posterior outline obliquely truncated in the upper portion, rounded in the lower; hinge line horizontal, straight; ventral margin rounded obliquely

# DESCRIPTION OF A NEW SPECIES OF HELIX, FOUND FOSSIL IN A CALCAREOUS SANDSTONE DEPOSIT AT KENT'S GROUP,

By Robt. M. Johnston, F.L.S.

[*Read* 11*th May*, 1880.]

Helix Simsoniana, n.s.

Shell solid, umbilicated, convexly depressed; whorls, 3¾, rapidly increasing, ornamented above by somewhat coarse wrinkled transverse striæ, which become more regular as they approach the nucleus; base convex, and obsoletely irregularly cancellated; periphery sharply keeled; umbilicus deep, and narrowly perspective; aperture oblique, lunately-ovate, with a broad, shallow sinus at periphery, which latter is less sharply keeled as it approaches aperture; margins simple, slightly converging, columellar margin curved, moderately thickened, and slightly reflexed.

Dia. max., 32 mil.; min., 25 mil.; height, 13 mil. Habitat: Fossil in calcareous sandstone (tertiary), Kent's Group.

This interesting fossil is more closely allied to the existing *H. Launcestonensis* than to any other Tasmanian form, and it is nearly its equal in size.

The fragments of rock, in which several specimens of this interesting shell were found imbedded, were presented to me by Mr. A. Simson, who obtained them through Admiral although only a single specimen exists in the collection, I think it should not be passed over in silence.

With the hinge characters I am quite unacquainted, the reference to *Anodonta* being made purely on external resemblance. It is, of course, possible that it may, after all, be an *Unio*, as some species of this genus assume a more or less *Anodon*-like aspect.

The present shell is too wide anteriorly, and the hinge is too horizontal for *Unio Menziesi*, Gray, from New Zealand. It has more the aspect of *Unio radiatus*, Gmelin, but it is too long a shell for this species, and the posterior end too much produced.

Our fossil approaches some of the flat forms of *Anodonta*, and it is with these that it must be compared. The more or less compressed valves, strong posterior angulation of the dorsal margin, obliquely truncated posterior margin, and obliquely rounded anterior margin, pending a knowledge of the dental characters of the hinge, all point in this direction.

*Loc. and horizon.*—Similar to the first locality of the preceding species (*British Museum*, Milligan Collection, Reg. No., 96,929).

## DESCRIPTION OF THE FIGURES.

UNIO JOHNSTONI,* ETHERIDGE, JNR.

*Fig.* 1. Side view of the right valve of an almost complete specimen, nat. size; Tamar River; Coll. Brit. Mus.

*Fig.* 2. The same specimen seen from the back, showing the hinge, and convexity of the valve; nat. size. Anodonta Tamarensis, Etheridge, jn.

*Fig.* 3. Side view of the right valve somewhat deficient about the posterio-ventral region; nat. size; Tamar River; Coll. Brit. Mus.

*Fig.* 4 The same shell showing the hinge line, and convexity of the valves; nat. size.

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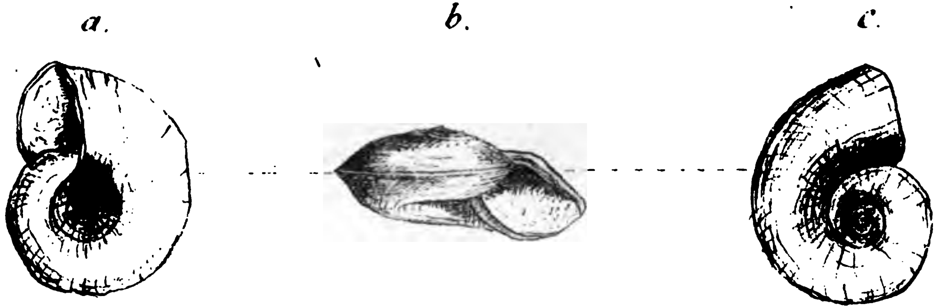

HELIX SIMSONIANA N.S. R M JOHNSTON

*Fossil Calcareous sandstone (Tertiary) Kents Group.*

*a View of base nat: size.*
*b. Elevation " "*
*c. Upper surface " "*

# NOTES ON SOME TASMANIAN PLANTS,

By Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S.

*Note.*—Helix Simsoniana. It is of great interest to find that the nearest allies of this *Helix* are now existing in the neighbourhood of Nelson and Auckland, New Zealand. It forms a connecting link between *H. Greenwoodi*, Gray, and *H. dunniæ*, ibid. That its nearest allies should now be found living in New Zealand is a matter of great importance to those who take an interest in the laws of distribution.

# NOTES ON SOME TASMANIAN PLANTS,

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., F.R.S.,

[*Read 8th June*, 1880.]

*Verbena afficinalis*, L. sp. pl. 20, near Launceston; Aug. Simson. The discovery of the medicinal Vervain in Tasmania, though not unexpected, is of double interest, inasmuch as this plant adds a natural order to the flora of the Island. This Verbena is rather widely, although not copiously, distributed through South-Eastern Australia, but not yet found in New Zealand, where however it may have been overlooked, as it has been for so long a time in Tasmania.

*Acradenia Frankliniæ*, Kipp., Pieman's River; Aug. Simson.

*Stackhousia flava*, Hook., Pieman's River; Aug. Simson.

*Fagus Gunnii*, J. Hook., Mount Roland, 3,500ft.; Emmett.

*Schœnus fluitans*, J. Hook., St. Patrick's River; Aug. Simson.

The genus *Diselma* is now reduced to *Fitzroya*, by Bentham, in B. and H. gen. plant., iii., 426 (1880), while *Frenela* is suppressed, to restore the genus *Callitris* again to its full right.

*Zieria veronicea*, F. v. M. in the transact. of the Philos. Soc. of Vict., i. 11 (1854), a narrow-leaved variety, Scamander Bridge, near the North-East Coast; A. Simson.

*Eucalyptus hœmastoma*, gum-topped stringy bark, Smith in the transact. of the Linn. Soc., iii., 285, Lake Sorell and elsewhere; Stephens.

*Sphacelaria Muelleri*, Sonder, and *Polysiphonia dendritica*, Agardh, occurred in collections of *Algœ* from Tasmania recently, for the first time; both came from Emu Bay.

# THE LICHENS OF QUEENSLAND.

By F. M. Bailey, F.L.S., with an Introduction by the Rev. J. E. Tenison-Woods, F.G.S., F.L.S.

[*Read 9th August*, 1880.]

## INTRODUCTION.

The Lichens of Australia have not received much attention from botanists, either in Europe or here. New Zealand has had its Lichen flora examined by many of the most experienced specialists. Tasmania also has had nearly the same advantages. In Australia no special essay has ever been devoted to the subject. A complete Lichen flora for the whole continent is what we would not expect. It would be unreasonable even to look for this for one of the colonies; but it is a matter of surprise that no one as yet has tried to determine and catalogue the ordinary species. What Robert Brown did was to catalogue those he found on the coast, and those obtained in the few hurried journeys into the interior, which were made by himself and others in his time. What he obtained caused him to conclude that two-thirds of the Lichens of Australia were identical with European species. No other essay appears to have been written on the subject until it was approached by Dr. Woolls, who, in 1867, published a little work on the Flora of Australia. This contained a series of essays on the botany of our continent, written in a popular style, and with a view to convey only popular information on the subject. Amongst the essays there is one on Lichens. In this there is the determination of a few species belonging to 13 genera, all growing in the of the New Zealand Lichens would lead us to this opinion. Those islands have proved to be peculiar in their Lichens in a remarkable degree. It is the province of *Stictas*. This is a very large temperate and tropical genus, which is not found in arctic or alpine regions, but is most abundant in New Zealand, either on the ground or on trees. The same genus is well represented in Australia, but, as far as we know, not to the same extent as in New Zealand. We do not know as yet what is our commonest form of Lichen, or if we have any which predominates, but the results so far are of great interest, and stimulate enquiry.

The study of Lichens, however replete with interest, is still a very difficult one—so difficult that the most eminent lichenologists are far from being in accord with one another. I do not allude now to the discussion which is taking place as to the nature of the plants, but as to the classification. Then there are many arrangements of the various families, but botanists seem a little divided between the merits of two systems, namely, that of Fée and that of Nylander. The latter has been followed by Hooker in his New Zealand and Tasmanian Flora, and I believe is the system most generally approved of. It has also this advantage, that Dr. Nylander has himself arranged many Australian, Tasmanian, and New Zealand species; but, whatever system be adopted, determination can only be made with the greatest caution. Dr. Hooker says, in the handbook to the New Zealand Flora (p. 553), "For myself, I frankly confess that I find it impossible to determine even the foliaceous Lichens satisfactorily, except by comparison of specimens, whilst the species of the crustaceous and corticolous genera are so difficult to examine, and impossible to describe in definite language, that I doubt any two independent workers coming to a tolerably close agreement regarding their limits and nomenclature, even if they worked upon the same specimens."

I will take the liberty of inserting in this place a few remarks on the organs of Lichens, taken from Dr. J. Hooker. I do this for the sake of those students into whose hands this essay may come, and who may not have any easy access to the authorities, or manuals which treat of the subject. It is very desirable to excite an interest on lichenology in Tasmania, where so much has still to be learned, and so much that may be of importance to the colony may be discovered in this department of botany. Lichens contain dye principles of great value, as I shall show presently. Their study, in the most important fields, will be in portions of the Island now well known, but which were not accessible to Dr. Hooker when he made his census. These are exactly the places where books are not accessible, and yet where this little essay may easily find its way. No other apology, therefore, will be needed for reprinting Dr. Hooker's remarks.

Lichens are a very large natural order, found in all climates and latitudes. Upwards of 1,300 species are described, very many of which have most extensive ranges of distribution, from the Arctic Circle to the Equator, in both hemispheres. Like most of the Cryptogamic orders, they chiefly affect damp temperate climates. They are composed of a thallus, which usually spreads horizontally over dead wood, bark of trees, or rocks. In many genera the thallus is erect or pendulous, and sometimes it grows from the earth like moss. The thallus may be (1) *effuse*, that is without determinate shape; or (2) *effigurate*, determinate in shape; (3) *scaly*, formed of small coriaceous scales; (4) *crustaceous*, of a thick crusty substance; (5) *powdery*, or *leprous*, when formed of minute membranous scales; (6) *granular*, composed of minute granules; (7) *foliaceous*, forming leaves like branches. The attachment of the thallus may be by the whole under surface, or by fibrils or bundles of short filaments, and may be by one point or many. When the thallus is erect it is often called a podetium, a name given to the erect cylindrical portion of a horizontal thallus.

Four kinds of reproductive organs have been noticed in Lichens, viz.:—1. *Apothecia*, circular or variously shaped shields, cups, or prominently formed of closely packed jointed filaments and closed tubes *(asci)*, which contain simple or septate spores. 2. *Spermagones*, minute open cavities in the thallus, containing filaments *(sterigmata)*, upon which are extremely minute colorless bodies called *spermatia*. 3. *Pyc-*

These strata were formerly supposed to be independent Lichens, and constituted the genus *Lepraria*. Sometimes the gonidia invade the apothecium of Lichens, which gave rise to another false genus, *Variolaria*. 3. A medullary, spongy, filamentous, or cottony layer, composed of a network of jointed delicate threads; these are sometimes developed downwards, forming rootlets or fibrils on the under surface of many horizontal thalli. The hypothallus is a rudimentary horizontal stratum, from which the thallus grows, and is only distinguishable in the youngest state of the more highly organised Lichens, and lies beneath the crustaceous or granular thallus of the more lowly.

The apothecia are usually discoid, dark-colored bodies, occupying various portions of the thallus, rarely, however, the under surface. In *Nephroma* they occupy the lower recurved margin. They may be orbicular, linear (lirellate), sessile or stalked, superficial or sunk in the thallus, convex, concave, or sub-globose, and of all colors. The apothecia consists of the exciple or receptacle and thalamium.

The receptacle is the enveloping portion of the apothecium, and is formed of the substance of the thallus. When the apothecium is adnate to the thallus, the receptacle only borders it, and when the apothecium is peltate or stalked, the receptacle forms its under surface also. When the bordering portion is of the same color as the thallus, it is called a thalline, or thallodal border; when of a different color, or that of the thalamium, it is called a proper border. The receptacle may be altogether absent, or almost enclose the thalamium, or form a globular capsule called a perithecium. The thalamium is usually solitary in each receptacle, but sometimes there are several, which are separate or confluent. It consists of a series of vertical, elongate, microscopic bodies, rising from a layer of minute cells, called the hypothecium, and they are usually held together by a transparent gelatine. The vertical bodies are two in number, paraphyses and thecæ or asci. The paraphyses are the most numerous; they are linear, subclavate, transparent jointed bodies, whose terminal cells are thick walled, are often crustaceous, warted, colored, and adhering together from the hard substance of the thalamium. The asci are shorter vertical bodies, linear, clavate or ellipsoid, tapering downwards, and consist of simple, thick-walled transparent sacs containing one or more, usually eight very minute spores. At maturity the ascus breaks at the top, discharges the spores and shrivels up, when fresh asci are developed from the hypothecium, and this process goes on as long as the apothecium, which is perennial, exists. The spores are usually ellipsoid, but may be of any shape, and are simple, or divided into sporidia by one or more transverse partitions; they are then called septate.

The spermagones are microscopic, simple, or compound cavities in the thallus, opening by pores, whose orifice is usually dark. They are full of gelatine, and contain sterigmata, which are simple or branched, articulate or inarticulate filaments, short, straight: articulate sterigmata are called arthrosterigmata. Upon the sides or tips of the sterigmata are the spermatia, which are most minute, ovoid, ellipsoid, linear or acicular, straight or curved colorless bodies. The spermatia accumulate in the cavities of the spermagone, and escape by its pore. They appear to be analogous to the antherozoids of *Algæ*, etc., but have no cilia, and are not developed into antheridia. They are found in maturity usually in spring or summer, long before the spores of the apothecium are mature, and the relations between these two kinds of organs are still disputed.

*Pycnidea* are longer, thicker walled, sometimes superficial spermagones, of which the sterigmata are simple, inarticulate, tubular, tapering pedicels, called stylospores, that bear at their tops bodies analogous to spermatia, but longer, curved, oblong, and full of granular contents.

In germination, the sporidia of a Lichen give off one or more branching filaments, whose branches interlace, and form a network, upon the hypothallus, which again developes into the medullary stratum. A layer of colorless cells next spreads over the hypothallus, and amongst these the gonidia appear. In many Lichens, including most of those growing on bark, there is no further development of thallus, the and subsequently the increase in the size of the thallus does not alter much for years.

The interest attaching to these humble organisms would be much greater if it were known what an important place they occupy in human economy. Thus the Laplander entirely depends upon the crop of Lichens to feed his reindeer, and to supply many other wants. *Cladonia rangiferina* forms the only food of the reindeer during the winter months. The surface of the soil is carpeted with it in Lapland, just as in the table lands of many parts of South Tasmania. I have seen the ground covered with a thick growth of *Cladonia retipora* several inches in height. Another beard-like Lichen, *Usnea florida*, is gathered largely in N. America, to be stored as winter fodder for the cattle. The well-known Iceland moss, *Cetraria Islandica*, is a Lichen. It is still extensively used as a restorative in exhaustive diseases. Without it the Icelanders could not live. It is to them what wheat and oats are to the European. Several other species of Lichen are esculent, and there are few which might not be used to stave off starvation in the bush.

In medicine, Lichens have been most extensively employed, though not so much in repute now as formerly. The bitter principle made them esteemed as febrifuges, and their astringent qualities recommended them as styptics and tonics. It is, however, to be borne in mind that most of their medicinal qualities are more to be attributed to the tree on which they grow than to themselves, because the Lichen, which has certain qualities when growing on a tree, does not possess them when growing on a rock or other different surface.

There are many other medicinal and domestic uses for Lichens, but I pass on to that which constitutes their greatest value, and that is the possession of colors which make them of use to the dyer. It is not generally known that the original colors of the Highland tartan were derived from dyes produced by the Lichen. The colors were prepared by boiling the thallus in water along with other ingredients, such as heather, twigs, birch-leaves, the roots of the nettle, and other common plants. The twist was soaked in the liquor, and by this means dyes of brilliant and lasting tints of red, yellow, green, blue, or black, in varying shades, were obtained. By a combination of the threads in weaving, the well-known tartan was produced. The best and most useful of the native dye Lichens is the cudbear, so called after Mr. Cuthbert, who first brought it into use. The species is known as *Lecanora tartarea.* I am not aware that the species is found in Australia, though we have a few of the genus. The dye is quite equal to any orchin, and is capable of being modified into any tint of purple or crimson. A beautiful and valuable crimson pigment is obtained from a dark-brown shrubby British Lichen named *Cornicularia aculeata.* The common stone Lichen of Scotland, which forms grey rosettes on every rock, is much used by the Scotch peasantry to dye woollen stuffs a dirty purple or reddish-brown color. For much valuable information on this subject, the matter is referred to Dr. MacMillan's "First Forms of Vegetation," or Lindsay's "British Lichens." Dr. MacMillam states that in the low rocks on the summits of all the loftiest Highland hills there is a curious leafy Lichen, *Parmelia fahlunensis,* found abundantly, and with the appearance as if it had been scorched by the sun into a black cinder. Of all Lichens he says this species, judging from its outward color and appearance, would seem to be the last capable of yielding coloring matter; and yet, when treated in the ordinary way, it yields a brilliant pink-cherry or claret color, which in France has been applied to so many useful purposes that the Lichen is known as "*Herpette de Tenturiers,*" or dyers' Lichen. But the most valuable of all Lichens is the *Roccella tinctoria,* or *Orchil,* which is so extensely used in dyeing, and is still largely imported from the tropics. It is found as far north as the Channel Islands, but is not in any quantity. It used to form a valuable article of export from the Canary Islands. At present the kinds of *orchil* most sought after are imported from the coast of Africa.

The coloring matter of all these species separates itself quite easily when rubbed under water. The water becomes milky from erythric acid, which settles in the water as a fine dry and desert country it possesses; but, just as our coast line is very rich in species of ferns and fungi, so it is in Lichens. Our *Cryptogamic* flora generally may be regarded as best represented on the coast from Tasmania northwards, becoming richer in proportion as the climate becomes warmer. Amongst the Queensland Lichens, as in New Zealand and Tasmania, we find a good many species which are found all over the world, but not so many as R. Brown supposes. It must not surprise us to see them so widely diffused when we remember how excessively fine the spores are, and how easily borne along by the very lightest breath of air. As far as it has been examined, the Queensland Lichen flora possesses many novelties, but it is not sufficiently known to make any general conclusions. The species here described belong to 34 genera, distributed in the following way:—*Obryzum*, 1; *Collema*, 1; *Leptogium*, 3; *Myriangium*, 1; *Bæomyces*, 1; *Cladonia*, 8; *Usnea*, 5; *Ramalina*, 4; *Platysma*, 1; *Nephromium*, 1; *Sticta*, 4; *Stictina*, 6; *Parmostricta*, 1; *Parmelia*, 24; *Pyxine*, 3; *Pannaria*, 2; *Coccocarpia*, 1; *Lecanora*, 8, with 4 varieties; *Pertusaria*, 3; *Thelotrema*, 2; *Ascidium*, 2; *Cœnogonium*, 3; *Lecidea*, 20; *Graphis*, 9; *Opegrapha*, 1; *Glyphis*, 3; *Arthonia*, 1; *Chiodecton*, 2; *Trypethelium*, 3; *Endocarpon*, 1; *Plagiothelium*, 1; *Verrucaria*, 12; *Strigula*, 3; *Physcia*, 1.

This makes in all 145 species, and four varieties. The Lichen flora of Queensland must be, of course, much larger than this. In New Zealand, which is the best known of the Australasian islands in this respect, there are 44 genera, and about 250 species, that is including Dr. Lindsay's enumerations. A good many of the New Zealand species are found in Australia, but probably not all. In general there is a strong resemblance between those of New Zealand and all the Pacific Islands. Some relations also exist with South America. Both these features appear in Australian Lichens, but not in so marked a manner. In New Zealand the Highland dye Lichen, *Lecanora tartarea,* occurs, but not *Roccella tinctoria*. *Parmelia saxatilis* is another dye Lichen which is common in New Zealand, and is most probably in Australia as well, because it is of world-wide distribution.

As a guide to those who may be in search of these organisms, it must be remarked that collections from various places are what are most needed. It must not be imagined that because many species have a wide distribution that some are not very local. Again, external resemblances are no guide in establishing the identity of species—a minute examination and comparison will be necessary. So that beginners need not fear, in collecting everything, that they are not making useful additions to the knowledge of our flora. *Collema* and *Leptogium* are generally seen as a brownish-green sort of skin on the bark of many scrub trees; on these *Obryzum* has been found as a parasite at Ipswich, in Queensland; on the ground will be found *Bæomyces*, and sometimes *Cladonia*, though the latter will be more common on logs and rocks; *C. Flœrkiana* and *C. marcelenta* are easily recognised by their numerous red caps, and *C. retipora* by its net-like appearance; all the beard mosses, or *Usnea*, will need no description; they hang from the branches of trees, or on dead wood, fences, etc., in a conspicuous manner.

Mr. Bailey states that *Usnea longissima* is extensively used in Queensland, entwined round the hat as a protection against the sun. The common *Usnea* on our fences is generally *U. barbata*, var. *cornuta*, very common on the Blue Mountains, New South Wales. With this is found *Ramalina complanata* around Brisbane, but it is most abundant on the main range. The *Stictinas* are all of large foliaceous habit, but the close damp gullies of the ranges are the places for them on rocks, logs, and trunks of trees. With these also will be found the genus *Sticta*. The *Pyxine* of the accompanying list, I am informed by Mr. Bailey, was taken from a tree on the coast, near Cairns, Trinity Bay. The *Physcias* are abundant on the fences, scrubs, trees, and rocks, with the exception of *P. chrysopthalma*, which prefers slender twigs. "To see a dead branch covered with this delicate and beautiful species is worth a trip to the scrub at any time."—*Bailey*. I am indebted to the same gentleman for most of the following facts:—*Parmelia* is pretty common everywhere. *P. tinctorum* covers the rails of fences; *P. perforata* determined have been submitted to Dr. Stirton, of Glasgow, who has described the new species, and that a good many have also been named by the Rev. Mr. Leighton, of Shrewsbury, England.

In conclusion, it will be observed that I have not made any direct reference to the Tasmanian Lichens in comparing them with those described here. The reason of this is that the Tasmanian Lichen Flora is so very imperfectly known. Forty-four genera and about 100 species are described in Dr. Hooker's Flora. This is even less than the present contribution to the Lichenology of Queensland. Amongst those described we find about one third of them in the present list. *Sticta* is also abundant in Tasmania as in New Zealand, and there is generally a close resemblance in the genera and species occurring in both. Dr. Hooker says that all the European species are represented in Tasmania, but this I think must be received with hesitation until a better census of the island is made. It is certain that a complete list of Tasmanian Lichens is one of the most interesting botanical *desiderata.*

## A FEW QUEENSLAND LICHENS.

*Dr. Nylander's Arrangement.*

### Family I.—Collemacei.

Thallus black-brown or olive-green, often sub-gelatinous; gonidia without a cellular membrane, usually traversing the thallus in moniliform lines; apothecia often red, white, or pale inside.

Tribe *Lichinei.*—Thallus shrubby. *Obryzum scabrosum,* Stirton; parasitic on *Collema*; on trees, Ipswich.

Tribe *Collemei.*—Thallus usually horizontal, foliaceous, lobed. *Collema byrsinum,* Ach.; on trees in damp scrubs.

*Leptogium diaphanum,* Mont.

*L. phyllocarpum,* var. *isidiosum.*

*L. tremelloides, Fr.* var. *cœruleum,* all abundant on trees and rocks in damp scrubs.

*Myriangium Duræi,* Mont., a dark spot-like species on twigs of trees, found in dense scrubs.

### Family II.—Lichenacei.

Thallus variously coloured, not soft or gelatinous; gonidia with a cellular membrane.

Series *Cladodiei.*—Thallus usually erect; apothecia terminal on erect podetia, usually without a border; spores, often 8 in an ascus, oblong, rarely elongate and septate.

Tribe *Bæomycei*.—Thallus horizontal, crustaceous; apothecia pale-red or brown; spores simple, or 1-3-septate.

*Bæomyces rosens*, Persoon. On damp hill-sides. Thallus white; apothecia rosy.

Tribe *Cladoniei*.—Thallus foliaceous or scaly, or of branched shrubby podetia; apothecia convex, without a border; spores simple.

*Cladonia Flœrkiana*, Fr.; on wood.
*C. schizopora*, Nyl.; amongst moss.
*C. gracilis*, Hoffm., var. *aspera;* on wood.
*C. retipora*, Flærk.; amongst moss.
*C. marcilenta*, Hoffm., var. *seductrix*, Del.; on wood.
*C. aggregata*, Eschn.; amongst moss.
*C. cervicornis*, Ach.; on wood.
*C. pyridata*, Fries.; on wood, Stradbrook Island.

Series *Ramalodei*.—Thallus shrubby, or filamentous, erect, or pendulous; terete compressed or angular, without any basal crust or scales, tubular or solid; apothecia usually with a thalline border.

Tribe *Usneei*.—Thallus white or yellowish, branched, with a firm filiform axis; apothecia peltate, with a thalline border, which is often ciliate.

*Usnea cornuata;* on trees, Brisbane River.
*U. longissima*, Ach., pendulous; from trees, Brisbane River.
*U. articulata;* on trees, Main Range.
*U. rubiginea*, Ach.; on fences, Brisbane.
*U. elegans*, Stirton; on shrubs, Main Range.

Tribe *Ramalinei*.—Thallus tirete or compressed, erect or pendulous, with lax pith or hollow internally; apothecia with shrubby; apothecia with a thalline border; Spermagonia with arthrosterigmata.

*Sticta aurata*, Ach.; *Cyphellæ punctiform*, orange-yellow.
*S. pulmonacea*, Ach.; on trees. Ranges.
*S. retigera*, Stirton; on trees. Ranges.
*S. Felix*; on trees. Ranges.
*Stictina gilva*, Thun.; on rocks and trees.
*S. quercizans*, Ach.; on rocks and trees.
*S. lutescens*, Tayl.; on rocks and trees.
*S. marginifera*, Tayl.; on rocks and trees.
*S. tomentella;* on rocks and trees.
*S. fragillima*, Alf. Cyphellæ minute, white; on rocks and trees.
*Parmosticta rubrina*, Stirton; on trees.
*Parmelia conspersa*, Ach.; on rocks and trees.
*P. sinuosa*, Sin.; on rocks and trees.
*P. Brisbanensis*, Stirton; on trees, Brisbane.
*P. perlata*, Ach.; on trees, margin of lobes often with black hairs.
*P. reparata*, Stirton; on trees, etc.
*P. caperatula*, Nyl.; on trees, etc.
*P. molliuscula*, Ach.; on rocks, Glasshouse Mount.
*P. revoluta*, Flk.; on trees, etc.
*P. limbata*, Sonr.; on trees, etc.
*P. perforata*, Ach.; on trees, etc.
*P. tinctorum*; on fences, etc.
*P. umplerula*, Stirton; on trees, etc.
*P. olivetorum*, Ach.; on trees, etc.
*P. anstra-africana*, Stirton; on trees, etc.
*P. permutata*, Stirton; on trees, etc.
*P. platycarpa*, Stirton; on trees, etc.
*P. cyathina*, Stirton; on trees, etc.
*P. euplecta*, Stirton; on trees, etc.
*P. nitescens*, Stirton; on trees, etc.
*P. erubescens*, Stirton; on trees, etc.
*Physcia confluens*, Mont.; on trees, etc.
*P. hypoglauca*, var. *chrysophthalma;* on trees, etc.
*P. picta*, Nyl.; on fences, etc.
*P. speciosa*, Fr.; on fences, etc.
*P. barbifera*, Nyl.; amongst moss, Brisbane River.
*P. obsessa cæcio-crocata*; on trees, Main Range.
*P. sublurida*, Stirton; on trees, Rosewood.
*Pyxine Meissnerii*, Tuck.; on trees.
*P. cocoes* var. *sorediata;* on trees.
*P. obscurior*, Stirton; on trees.

Series *Placodiei.*—Thallus crustaceous, scaly, granular, powdery, or evanescent; apothecia with or without a thalline border, sometimes linear.

Tribe *Lecanorei.*—Thallus various; apothecia with a thalline border, rarely without.

*Pannaria pannosa*, Sw.; on trees.
*P. triptophylla*, Nyl.; on trees.
*Coccocarpia plumbea*, Leighton; thallus lead colored, bordered by the black hairs showing from beneath.
*Lecanora cinnabarina*, Ach.; on rocks.
*L. subfusca*, var. *chlarona*, Ach.; on trees.
*L. parella*, var. *pallescens*; on trees.
*L. p.*, var. *phæolenca*; on trees.
*L. Domingensis*, Ach.; on trees.
*L. D.*, var. *gyrosa*; on trees.
*L. sprucei*, Bab.; on foliage.
*L. punicea*, Ach.; on trees.
*L. pinguis*, Tuck.; on trees.
*L. tartarea*, Linn.; on trees.
*Pertusaria porinella*, Nyl.; on trees.
*P. leioplaca*, Ach.; on trees.
*P. leioplacella*, Nyl.; on trees.
*Thelotrema phæosporum*, Nyl.; on trees.
*T. terebratulum*, Nyl.; on trees.
*Ascidium depressum*, Nyl.; on trees.
*A. profundum*, Stirton; on trees.

Tribe *Lecidiei.*—Thallus various; apothecia without a thalline border.

*Cœnogonium Linkii*, Ehrenb.; on tree trunks, Maroochie.
*C. interpositum*, Nyl.; on tree trunks, Brisbane scrubs.
*C. confervoides*, Nyl.; on trees, Maroochie.

*L. demutans;* on bark, Taylor's Range.

*L. aberrata*, Stirton; on boughs of ironbark trees.

Tribe *Graphidei.*—Thallus very thin, often invisible or beneath the bark; apothecia like cracks, flat or plicate, with or without a border.

*Graphis eludens*, Stirton; on rocks, Moggil.

*G. malacodes*, Nyl.; on bark.

*G. circumfusa*, Stirton; on bark.

*G. Afzelii;* on bark.

*G. mucronata*, Stirton; on bark.

*G. fisso-furcata*, Leighton; on bark.

*G. persulcata*, Stirton; on bark.

*G. (Medusula) pertenella*, Stirton; on bark.

*G. repleta*, Stirton; on bark.

*Opegrapha intrusa*, Stirton; on bark.

*Glyphis labyrinthica*, Ach.; on bark.

*G. confluens*, Mont.; on bark.

*G. medusulina*, Nyl.; on bark.

*Arthonia cinnabrina;* on bark.

*Chiodecton farenaceum*, Fée; on bark.

*C. sphærale*, Ach.; on bark.

Series *Pyrenodei.*—Thallus various, peltate, scaly, areolate, continuous, or none; apothecia opening by a punctiform pore.

Tribe *Pyrenocarpei.*

*Trypethelium sprengelii*, Ach.; on bark.

*T. papillosum*, Ach.; on bark.

*T. cruentum;* on bark.

*Endocarpon Baileyi*, Stirton; a very curious thick species found on trees, rosewood scrub.

*Plagiothelium Australiense*, Stirton; this is a new genus, founded by Dr. Stirton on a Queensland Lichen.

*Verrucaria catervaria*, Fée; on bark.

*V. circumrubens*, Nyl.; on bark.

*V. obovata*, Stirton; on bark.

*V. mæstroides*, Ach.; on bark.

*V. ceratina*, Fée; on bark.

*V. libricola*, Fée; on bark.

*V. aurantiaca*, Fée; on bark.

*V. nana*, Fée; on bark.

*V. nitidiuscula*, Nyl.; on bark.

*V. sinapisperma*, Nyl.; on bark.

*V. tropica*, Ach.; on bark.

*V. flaventior*, Stirton; on bark.

*Strigula complanata*, Fée; on foliage.

*S. nemathora*, Mont.; on foliage.

*S. elatior*, Stirton; on foliage.

structure, which is evidently a mere remnant of the original tissue of the leaf. Just sufficient is left to barely indicate its general outline and feature. This will be seen in the specimens sent, one of which presents a more perfect form of the original leaf than is usually met with. By measurement, this one is 4 inches long, by $1\frac{1}{4}$ inches broad. It is evidently membranous as regards its texture, with margin entire; its venation is reticulate, with the mid-rib giving off on each side alternate lesser veins. In shape it is oblong-ovate, with apex acute. No petiole is seen in specimen. The mass of the leaves found much resembles this one, some being larger, as I have measured one which was 3 inches broad, and over 7 inches long, but generally they are seen to be of a much smaller size than either of these two.

These leaves evidently belong to the Botanical Division *Angiospermia*, and as yet no foliage belonging to the coniferous trees has been discovered in this continent. It was reserved for Mr. R. M. Johnston, of Launceston, to be the first to discover the foliage of a conifer (most probably of the *Spondylostrobus Smythii*) at Beaconsfield. This has been delineated by Baron von Mueller in the Victorian Mining Reports, and commented thereon by him. The Baron there too acknowledges the value of Mr. Johnston's exertions on behalf of the geology of Tasmania, and the assistance he has obtained from him in studying the Palæontological Flora of these lands.

Embedded in the same clay with these leaves and fruits are found the branches, trunks, and roots of the trees that bore them. Frequently it has been noticed by the miner

*Eisothecaryon semiseptatum*
*Wilkinsonia bilaminata*
*Octhodocaryon Wilkinsonii*
*Odontocaryon Magregorii*
*Rhyndotheca Lynchii*
*Plesiocapparis leptocelyphis*
*Illicites astrocarpa*
*Conchocaryon Smythii*
*Trematocaryon McLellani*
*Celyphina McCoyi*
*Plesiocapparis prisca et myosperma*
*Conchotheca rotundata et turgida*
*Pentenne Clarkei*
*Pentenne brachy—et trachy—clinis*
*Dienne pluriovulata*
*Platycoila Sullivani*
*Rhyndocaryon Wilkinsonii*
*Rhymalocaryon bivalve*
*Pentacoila Gulgonensis*
*Acrocoila anodonta*
*Tricoilocaryon Barnardi.*

# ON SOME INTRODUCED PLANTS OF AUSTRALIA AND TASMANIA.

By the Rev. J. E. Tenison-Woods, F.G.S., F.L.S., Hon. Mem. Roy. Soc. Tasmania, and President of the Linnean Society of N. S. Wales.

[*Read* 13*th September*, 1880.]

A good deal of attention has been devoted to the introduced plants of Australia and Tasmania, and various lists of those introductions have been given in different colonial publications. Dr. Hooker has added a rather extensive catalogue in his introduction to the Flora of Tasmania, and since then the subject has been dealt with by Baron von Mueller, Dr. Woolls, and Mr. F. M. Bailey. But while these essays have given complete lists, and thus serve as records for distinguishing hereafter what is indigenous to the country, and what is not, none have especially dealt with the peculiar and abundant spread of some plants in certain localities, and not in others. This is what I propose to consider in the paper which I offer to the Society.

Any one who travels much in Australia will be struck by the prevalence of plants, which are called weeds, in some districts. Some of these have a very wide range, and wherever they are found are most abundant. They seem to grow and flourish under the most adverse and different conditions. Others, though equally abundant where they grow, are limited in their range. Now this varies in a remarkable manner for different parts of Australia and Tasmania. What cover the whole hill-sides and every vacant spot, with a pale yellow hue that can be seen for miles. It has long succulent leaves, and the climate or the soil of this part of Australia seem so suitable to it that it revels in luxuriant growth in every place. No sort of soil seems too poor, and no kind of hard usage will destroy it. It grows in knee-deep masses by the wayside, it spreads on the paths that are constantly trodden over, and even it is found in ruts and on ridges in the middle of the country roads. On the whole, its appearance is rather in its favor. The ligulate floral rays are of pale yellow color. They are long, and make the flower look at a distance like a conspicuous star. The centre is apparently quite black, but under the microscope the disk florets are seen to be a very dark purple. The stem of the flower is solid, and the leaves rather ornamental. But, however abundant and luxuriant, its life is but short. It is one of the first flowers to feel the effect of the burning heat. After the first few hot days of the summer, the weed has left no traces behind it, except its withered and dead leaves. The dense mass of woolly pappus, which covers the ground, defiles everything, besides being most injurious to wool, etc. This rapid disappearance of the weed is one of the great objections to it. When it is fresh and green, cattle will feed upon it readily, but it lasts such a short time; and when it is gone it has so completely occupied the ground that there is nothing to occupy its place. Its spread over the whole of the districts round Adelaide has something alarming about it, especially as it is known to have been introduced from the Cape of Good Hope within the last 40 years. I am not aware how far it has gone north of Adelaide, though I have seen it abundant at least 60 miles away. To the south it has spread rapidly and extensively. There are some who look with apprehension at its progress. It is already very abundant round Melbourne, and has made its appearance in Tasmania. I don't remember ever having remarked it about Sydney, or the flats on the sea side of the Blue Mountains. On the Bathurst Plains it is not known, nor in any of the Western Districts, as far as I have been able to enquire. All these places have other pests to deal with, as I shall relate in due course. I may observe here that the apprehensions about the spread of this weed are probably exaggerated. There seems a limit to the spread of these weeds, the cause of which we are not acquainted with, but which would very easily be discovered were we to pay attention to their habits. These may not operate in other places, or they may be counteracted by circumstances of a different kind. Thus I have thought, though I do not say it is the correct explanation, that why the seed spreads so well in South Australia, is the long period of dry weather, accompanied by the strong hot winds. This may free the seed from its woolly pappus, and secure its transport spread and desiccation until it is ready for germination. This may be exactly the time when the autumn rains come in South Australia. None of these conditions would be favourably found in New South Wales or Queensland. December and January are wet months, indeed all the summer is more or less rainy. The seed would neither be scattered nor dried. The woolly covering would, when wet, fix it on the soil. I only offer these suggestions, not as giving the right explanation, but as showing how the facts are capable of interpretation by a careful attention to the habits of the plant.

Another curious instance of the rapid but partial spread of a weed is found in the same order of *Compositæ.* This is the well known *Carduus marianus,* Linn. It is equally common in the southern parts of South Australia, in Victoria, New South Wales, Tasmania, and some parts of Queensland. It chooses open ground for its spread, though very often poor and sandy soils. It produces immense tufts of its peculiar large juicy leaves. Sometimes it covers the ground closely—as closely as it can possibly grow—and this to the extent of several acres. It thus spreads into a thicket four or five feet high, with the large flowerheads on their long stalks considerably higher. In this way I have seen it keep to the same open space for two or three years, not spreading much beyond, and then I have known it as suddenly to disappear. It seems to be a more troublesome and persistent weed in Tasmania than in Australia. In New South Wales it is wellknown, and the history and manner of its spread has been so much written about, that I need not particularise it here. I will just observe, however, that it has not spread very much into New South Wales, and is not a troublesome weed. It is in Victoria and Tasmania its advance has been chiefly felt, and as we hear less about it than formerly, we may suppose that the measures taken for its extirpation have been in some degree successful.

*Carduus (cnicus) arvenis.* Californian, Canada, or Creeping Thistle, so pernicious in Tasmania as a weed, is not known in New South Wales or Queensland, and probably South Australia. In Victoria I have had no recent means of ascertaining.

In many parts of South Australia, and notably in the rich volcanic soils around Gambier, one of the most terrible pests to the farmer is the common wood sorrel, *Rumex acetosella.* It is not so conspicuous as other weeds, but it is almost impossible to eradicate, because of the way in which the small wire-like fragments of roots germinate when every other part of the plant has been removed. I believe that the same species is the farmer's plague in Victoria and Tasmania, but complaints about it are not common in New South Wales or the colony of Queensland.

It is needless to refer to the common sweet briar, *Rosa rubiginosa,* as an instance of how a plant will become a dangerous weed when, from its peculiar character, it would not be supposed very likely to spread. In Tasmania, unfortunately, its baneful propensity is well known. It has spread widely over the pastoral districts, and forms bushes and thickets which not only exclude more useful plants, but its thorns are very injurious to the wool, and remove considerable portions of the fleece from the sheep which browse near it. It is remarkable that this weed is only known to spread on the high table lands of New South Wales. Its most common habitat is the Bathurst district, where it is every bit as troublesome as in Tasmania. But I have not observed it anywhere else, nor do I think it would flourish except in places where it was not liable to great heat. The severe frosts and occasional snow of the Bathurst and other table lands seem to agree with its habits. I may mention, with regard to the weed which is so formidable from its shrubby habit, that no effort appears to have been made towards its extirpation in New South Wales. In fact, it is master of the situation, and covers the ground so thickly and deeply that it is next to impossible to meddle with it. In some places it is used for hedgerows, but that is not common. For the most part it merely encumbers the ground.

In the same district exists a weed which has obtained for and on the river banks, but especially on neglected ground it spreads with alarming rapidity. About Brisbane it is simply excluding every other vegetation in some places, and each year witnesses its wider extension, and makes it probable that some measures will have to be taken for its destruction. It has found its way into New South Wales, and is not uncommonly met with around Port Jackson. I have never seen it on the western side of the dividing range. It loves rich soils and those that have been recently under cultivation. Why it should never have spread before now is a difficult problem. I am not aware whether its cultivation was ever attempted, or that any artificial means were adopted to bring it from its natural home in North Australia. There can be no doubt that it possesses a most useful fibre. I have seen specimens prepared from it as fine and glossy almost as silk, and of extraordinary toughness. There is no great difficulty in its preparation, so that in time we may hope to see it utilised.

*Lantaria camera* is a showy garden plant which has spread very remarkably in certain places. Around Port Jackson, it has become a complete nuisance, forming dense thickets which render the shores almost unapproachable. As it is always covered with handsome flowers, and its bushes form dark masses of evergreen leaves, it is a very pleasing addition to the rocks and precipices of some of the bays. The effect of its immense overhanging masses of green on some of the shores is very beautiful. On the banks of the Brisbane River it has spread with equal luxuriance, and has become troublesome. Two things, however, seem to be conditions for its growth; these are, very rich soil and plenty of moisture, so it is of the dividing range, from Brisbane to Port Jackson, and even further. This is *Verbena bonariensis*, often met with cultivated in gardens, though there is nothing very attractive about it. It produces spikes of flowers something like lavender, but with no perfume. On the Cow-pasture Plains and the Nepean River it grows thickly on rich soils, often producing shrubs of over eight feet in height. It bids fair to become a mischievous weed. Already patches of many acres may be seen on the rich alluvial plains of any of the coast rivers. No animal eats it, so unless some unlooked-for check meet it the species is likely to spread.

One of the most attractive features of the northern ports of tropical Australia, is the profusion of large pink and white flowers, which line the shores and surround the town. In Townsville or Cleveland Bay the beach looks really beautiful from this cause. The flowers are pink and white varieties of *Vinca rosea*, a tropical relative of the well-known *Vinca major*, or common perrywinkle. The flower of the Queensland weed is very like the perrywinkle in size and shape, but the plant, instead of being a creeper, is a strong succulent under shrub, with stout, dark green leaves. It is the only very common weed or flower one meets all about the settled districts from Queensland northwards. It is not confined to the coast. It is just as common round the town of Charters Towers as at Townsville, and I found it abundant at Thornborough and Kingston, as the two townships of the Hodgkinson Diggings are called. It grows abundantly about Brisbane, but not to the extent that it is found round the settlements within the tropics. It is not at all difficult to account for its spread. Belonging to the order of *Apocynacœa* or dogbanes, its leaves are acrid and poisonous, so that no animal, not even the almost omniverous goat, will touch it. It seeds abundantly; and, as it is always in flower, there is practically no limit to its spread, as the seeds are very easily carried about by the wind. But it is strange to me how it follows the haunts of man, and it is not found at intervening places. I do not think it was transplanted to the Hodgkinson Diggings, yet there it is abundantly on the hills. That settlement is not yet four years old at the time I am writing. It is like the house nettle, it clings to the dwelling and is never far away from the houses. Another peculiarity in this species is its liability to vary. There is a white and a beautiful rose pink variety. The white flower has often a red centre, and the pink a white centre. But flowers uniformly white or pink are the most common. Now, one would imagine that this arises from cross-breeding, but it is not so. The flower of *Vinca rosea* is so constructed that it must fertilise itself. Like nearly all the members of the order, the style and on the river banks, but especially on neglected ground it spreads with alarming rapidity. About Brisbane it is simply excluding every other vegetation in some places, and each year witnesses its wider extension, and makes it probable that some measures will have to be taken for its destruction. It has found its way into New South Wales, and is not uncommonly met with around Port Jackson. I have never seen it on the western side of the dividing range. It loves rich soils and those that have been recently under cultivation. Why it should never have spread before now is a difficult problem. I am not aware whether its cultivation was ever attempted, or that any artificial means were adopted to bring it from its natural home in North Australia. There can be no doubt that it possesses a most useful fibre. I have seen specimens prepared from it as fine and glossy almost as silk, and of extraordinary toughness. There is no great difficulty in its preparation, so that in time we may hope to see it utilised.

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The butterfly I have just mentioned is a recent introduction to Australia from America. It is now very widely known throughout the continent, and I have seen it from Adelaide to Cape York. Quite recently immense flocks were met with by a vessel in the Pacific, at a distance of some 300 miles from the Australian coast. It is said to have been introduced by means of a plant which is very common as a weed in all Southern Queensland, and in the northern coast districts of New South Wales. This is *Asclepias curassavica*, or cotton weed, as it is called frequently. It has rather showy red and yellow flowers, and was a favourite in gardens until it became troublesome. So far it cannot be said to have spread mischievously, though it is very abundant in all waste places throughout the district specified. In the West Indies the dry and powdered root is used as a substitute for ipecacuanha. In Australia it is very inaccessible where it grows, and thus it does [illegible] of an acre or so in extent. At present the [illegible] as it threatens to be, but it has rapidly assumed [illegible] portions. It is hard to say, also, how it can be [illegible] Cutting it down does not meet the difficulty, as [illegible] ment grows readily. The depth to which it sends [illegible] also very considerable. I noticed the same weed [illegible] Brisbane River, and at Port Denison it forms a thicket [illegible] is impassable on the beach in a few spots. Of all the [illegible] I have mentioned it would probably be the worst. Not [illegible] does it exclusively occupy the ground, but nothing [illegible] approach or tread on the places where it grows.

It will be observed that, in the most of these [illegible] the spread of plants, they follow the course of rivers [illegible] not alone because the soil is so rich and moist for their [illegible] ment, but also because the seeds are more easily transported by the streams. A question will often arise as to how [illegible] plants were introduced at all, and I can give an answer [illegible] case of one; this is the common Fumitory, *Fumaria officinalis.* The late Mr. George Crouch, of Portland, assured me [illegible] he had never seen the plant in Australia until 185[illegible] [illegible] year he was surprised to find it growing abundantly in his garden, with some other new weeds. He had bought some [illegible] from a merchant vessel discharging at Portland, Victoria. [illegible] was English hay, the surplus of a supply for some valuable stock brought out in the vessel. Mr. Crouch assured me that wherever the hay had been stored, the Fumitory began to grow, and it is now widely spread over the colony. It is a common weed in the gardens near the Parramatta River, near Sydney, and in various other places.

In the preceding remarks I have not mentioned any of the more common weeds which are wide-spread, and about whose introduction, in some cases, the evidence is unsatisfactory. *Polygonum aviculare* is one of these. It [illegible] where near settled districts, and takes the pla[illegible] feed, by its abundant growth. In [illegible] *Hypochœris glabra* is the common weed [illegible] much seen on the east coast. Eri[illegible] spread everywhere, but especiall[illegible] Queensland. Amongst the [illegible] weeds are the common Rei[illegible] there is an approach to the [illegible] though I am not so sure of the last being in the tropics. It is curious to remark also that species of certain plants which have become abundant weeds in Great Britain are spreading to an equal extent in some parts of this continent. Thus *Galensoga parviflora* is a South American Composite weed which has of late years become a very wide-spreading nuisance in the gardens around London. It is likewise very abundant in all gardens about Port Jackson and Brisbane. This weed is a species of *Amaranthus*, one of the most common and disagreeably abundant garden weeds of New South Wales.

I have not alluded to *Ulex europeus* or common furze, which has spread so rapidly and so disagreeably in Tasmania. It is not known as a weed in Australia.

# DESCRIPTION OF TWO NEW SPECIES OF FISHES (*TRACHICHTHYS MACLEAYI*, AND *MENDOSOMA ALLPORTI*), CAUGHT IN THE ESTUARY OF THE DERWENT.

head 5 times. Dorsal fin notched; the sixth, seventh, and eighth are the longest, higher than the longest, of soft dorsal, and about one-fourth the depth of body. The first soft dorsal is situated in a line vertically drawn through the anus; the third anal spine longer than the thickish second, and about half the length of the longest dorsal spines. Pectoral rays more or less covered with linear oblong scales; simple rays of pectoral 5 feeble, all shorter than the immediately superior branched rays. Body scales moderately large anteriorly, decreasing in size towards tail. Caudal forked. Uniformly blackish grey, with a deeper shade along the back. Named in honour of the memory of the late Morton Allport, Esq.

This interesting fish was obtained by Mr. Webb from one of the Derwent fishermen. Mr. Webb states that he has occasionally caught the fish while "trumpeter" fishing, at certain seasons of the year, towards the mouth of the estuary of the Derwent. It is known to fishermen as "The Real Bastard Trumpeter," and vies with the latter in delicacy of flavour. The only fish allied to this species seems to be *M. lineatum,* Gay, from the coast of Chili. It is interesting to know that the only other species of the genus is to be found on the coast of Tasmania. I have included the Tasmanian species within the genus *Mendosoma,* of Gay, notwithstanding that the spinous dorsal has one more spine than the first described species. It is true that Dr. Gunther considers the number of dorsal spines to be of generic value, and within certain limits no doubt this is correct, but the allied genera, *Latris Chilodactylus* and *Nemadactylus,* show within a certain limit a wonderful variability in the number of dorsal spines in individuals of undoubtedly the same species. In such cases it would be absurd to base the generic standard too rigidly upon a character so variable.

| | | |
|---|---|---|
| The total length ... ... ... | $15\frac{1}{2}$ | inches |
| Length of head ... ... ... | $3\frac{1}{8}$ | ,, |
| Length of snout ... ... ... | $1\frac{1}{8}$ | ,, |
| Diameter of eye (horizontal) ... ... | $\frac{6}{8}$ | ,, |
| Greatest depth of body ... ... | $4\frac{6}{8}$ | ,, |
| Least depth at tail peduncle ... ... | $1\frac{1}{8}$ | ,, |
| Largest cycloid scale near shoulder ... | $\frac{1}{4}$x$\frac{1}{4}$ | ,, |
| Longest pectoral ray ... ... ... | $2\frac{1}{2}$ | ,, |
| Length first dorsal spine ... ... | $\frac{3}{8}$ | ,, |
| ,, of sixth, seventh, and eighth do. | $1\frac{2}{8}$ | ,, |
| ,, of twenty-third do. ... ... | $\frac{3}{8}$ | ,, |

| | |
|---|---|
| Length of first soft ray dorsal | $1\frac{2}{8}$ inches |
| „ of last do. | $\frac{4}{8}$ „ |
| „ of first anal spine | $\frac{1}{4}$ „ |
| „ of second do. | $\frac{1}{2}$ „ |
| „ of third do. | $\frac{3}{4}$ „ |
| „ of first soft ray (anal) | $1\frac{3}{8}$ „ |
| „ of last do. | $\frac{1}{2}$ „ |
| Longest ventral ray | $1\frac{3}{4}$ „ |
| Distance between occiput and first ray of dorsal | 26 mil. |
| Distance between last ray of dorsal and caudal | 21 mil. |

GENUS TRACHICHTHYS, Shaw.

Muzzle very short, rounded, not protruding; cleft of the mouth oblique; chin prominent; eye large. Exceedingly fine villiform teeth in both jaws, on the vomer, and on the palatine bones; eight branchiostegals. A strong spine on the scapular bone, and at the angle of the præoperculum, a small one on the operculum; suborbital arch with radiating ridges. Scales ctenoid rather small; abdomen serrated. One dorsal fin; ventral with six rays; caudal forked. Australia, Tasmania, New Zealand.

TRACHICHTHYS MACLEAYI. New sp.

D $\frac{5}{18}$, A $\frac{3}{10}$, V 8. Scales minutely irregularly spiniferous; a series forming the pierced scales of lateral line (about fifty),

| | | |
|---|---|---|
| Length of first dorsal spine ... ... | 5 | mil. |
| „ fifth „ ... ... | 17 | „ |
| „ first dorsal soft ray ... | 30 | „ |
| „ last do. ... ... ... | 15 | „ |
| „ first anal spine ... ... | 2 | „ |
| „ second do. ... ... ... | 6 | „ |
| „ third do. ... ... ... | 19 | „ |
| „ first anal soft ray ... ... | 15 | „ |
| „ last do. ... ... ... | 22 | „ |
| Breadth eye ... ... ... ... | 21 | „ |
| Length snout ... ... ... ... | 11 | „ |
| Length of series of abdominal scutes | 30 | „ |
| Breadth of largest abdominal scute ... | 7 | „ |
| Depth of do. ... ... ... ... | 7 | „ |
| Longest of marginal caudal spines ... | 11 | „ |

# OYSTER CULTURE AND FISHERIES.

By Captain Stanley, R.N.

[*Read* 13*th* *September*, 1880.]

The object of this paper is to attract attention to the important subject of oyster farming, as well as to induce thoughtfulness in the minds of the public on the subject of fisheries in general. The excellent natural position of Tasmania as regards climate, its numerous small ports and rivers, the fact of its being an island and a large proportion of its inhabitants likely to become maritime; all these circumstances tend to the conclusion that Tasmania will in the future largely not only consume fish itself, but supply the Australian markets with that most wholesome of food. At the present time we see very little indication of this; not only do we not fish ourselves to any extent worth speaking of, but we permit our neighbours, the Victorians, to do as they like with our fisheries, apparently ignorant of the fact that a precedent is being established, and that there may be difficulties hereafter concerning boundaries such as have confronted the people of Canada and the United States, or of France and England. At present it would certainly remind us of that well-known fable, "The dog in the manger," if we prohibited other colonists from fishing in our water, but the law requires to be explicit, and the imposition of a small tax would preserve existing rights. I am informed that a very fine fish bank exists at a distance of about 30 miles in a south-easterly direction from Cape Pillar, and I am willing to believe that this is only one of many. I feel confident that there are many oyster beds undiscovered; but who would care to waste time in finding a bed, when all the time, trouble, and energy would avail the toiler nothing. If there is one sentiment more grafted in human nature than another, it is the determination not to waste our labour for the benefit of other people; when we do, it is either by accident or we have miscalculated results.

Before proceeding, I beg it to be understood that I claim no originality or special knowledge in being bold enough to discuss the subject of fisheries, and more particularly the oyster fisheries. Others have been before me, and I am only contributing my iota, but I consider it an important one, which should be dealt with by the Legislature. It was my intention, in company with several other gentlemen, to endeavour to revivify one of the now despoiled oyster beds, but as a preliminary made myself acquainted with the protection the law afforded. To my astonishment I discovered that no tenure of an existing "scalp" could be obtained, though the Government would afford every facility to those who were desirous of making hazardous experiments in uncongenial places. This paper will therefore endeavour to place the Society, and through it the general public, in possession of a few facts in connection with fisheries, but more particularly the oyster fisheries. Most of my information has been taken from *Chambers' Information for the People*, the author of which has done more to cheapen, popularise, and disseminate knowledge than any other man in the world.

### 1st. On the Destruction of Oyster Beds.

Exactly as the constant demand for oysters in England has had the effect of impoverishing many of the natural "scalps" (beds), so the demand in Australia (principally Melbourne) has had the effect of impoverishing many of the natural scalps in Tasmania. Any one who has lately visited England will know from experience that the price of oysters in the retail shops is 3s. or 3s. 6d. per dozen, to which amount the price has risen in consequence of the scarcity of the article: the breeding stock on many of the beds having been parted with to satisfy the natural greed of the individual, supplies fell short, and prices rose. In England, Ireland, and France the natural scalps have nearly all been destroyed; the exceptions are those owned by private individuals.

In Tasmania, whenever an oyster bed lies within a municipality, it is under the control of the Municipal Council instead of the Central Government; though why this anomaly should exist it is hard to say. "Municipal Councils may make bye-laws not repugnant to law." *Sic.* But though an oyster bed may belong to a municipality, the law is strict as to

Cove, Port Esperance, Recherche Bay, Cloudy Bay, Little Swanport, Ralph's Bay, Carlton, New Town Bay, Risdon Bay, Prince of Wales Bay, Barnes' Bay. Spring Bay is said by some to have been ruined by a tidal wave which covered the oysters to a depth of 4in. with mud, but if so the oyster exterminators were only forestalled by a few months. Had the bay been in the hands of a company it would have been saved from destruction.

## 2ND. ON OYSTER CULTURE.

After the destruction of the oyster beds or "scalps" in France, the government, with the desirable object of once again establishing a lucrative industry, constructed large artificial beds in various places, for the purpose of teaching oyster-farming on the most approved principles. There are now many of these beds, but the most important are those of Arcachon, Marennes, and the Ile de Ré. The artificial method of gathering the spat was accidentally discovered by M. Bœuf, of the Ile de Ré, who observed young oysters attached to stones on the foreshore of the island. The breeding season being known, fascines are suspended in the channel through which the water washing the "scalp" must pass, and the infant oyster appears delighted to remain near its parents, and clings to anything that comes in its way. The particular plan of catching the spat would, I imagine, depend to a great extent upon the natural peculiarities of the spot; sometimes rough stones are thrown up in the form of walls, and the enclosures are then termed oyster parks. Tiles may be suspended in the same manner as fascines, and drain-pipes, I should think, would answer very well. The bottoms of vessels anchored near oyster beds are sometimes found covered with infant oysters. Oysters, according to age, are named thus:— Infant oysters are those which have not long been spatted; the second year the oyster is known as "brood;" the third year as "ware;" and in the fourth year they are supposed to be full grown: they will, therefore (to re-enumerate them), be the spat or spawn, the infant oyster, the brood, and the ware. After the infant oysters are planted out, they require to be carefully watched and preserved from their enemies, of which the most notable is the star fish; their inanimate enemies are sand, mud, and weed, and in artificial beds a cleansing process is constantly going on by means of rakes or dredges.

An important fact to remember in oyster culture is, that it is essential that young oysters should begin life on a shelly or rocky bottom. In England they are careful to keep the young oysters below low water-mark on account of the frost, but here they would succeed nearly up to high water-mark. Wherever I have seen them on the shores of Australia, they seemed to me to thrive better between high and low water-marks. Of all the artificial oyster beds in England, the most noted, and the only one of which it is my intention to write, is the Whitstable. To quote from *Chambers* :—"The Whitstable Oyster Company is a well-organised industry of the co-operative kind, the proprietors of the farm being also the labourers who work it, and it is most systematically 'worked,' both during the season and in close time. The company is possessed of a very large stock of oysters, which they purchase as "brood" from wherever it can be obtained. These young oysters are laid down to grow and fatten, and are most carefully tended and watched till they are large enough to be sent to market, it being a rule of the company to wait till they can obtain the highest possible price for their goods. Only a certain quantity is dredged each day, the sales being regulated by the state of the market. Great care is required in breeding oysters; the artificial layings at Whitstable are therefore under constant inspection, the different beds being turned over from time to time in order to the removal of dead or diseased 'natives,'—likewise for the capture and removal of some of the numerous enemies of the mollusc which are always to be found haunting the different beds. About Whitstable and Faversham the oyster grounds occupy a space of nearly twenty-seven square miles; and it has been computed that £160,000 per annum has been paid away as wages to the men connected with the various companies. The Whitstable oyster layings are managed by a jury of twelve men, who are elected by their fellows; and it is an article in the constitution of the company that no member can be years, and the present system of granting licences abolished; also, that in the event of the discovery of beds hitherto unknown, the discoverer shall have a pre-emptive right of leasing at an average price." The advice contained in this report is clear. The natural beds (if it is desirable that the oyster should not be exterminated) should be leased by auction for a period of 21 years, residence by the lessee, or his agent, being made a guarantee of good faith. A denuded oyster bed thus leased would give no return whatever for four years, therefore I argue that 21 years is not too long a lease. A liberal law is required if it is considered desirable to attract capital; the idea of sub-dividing beds, as recommended by the select committee, is, I think, a mistake. The Whitstable and Faversham oyster grounds occupy a space of 27 square miles, and I think it necessary for the growth of Tasmania that there should be larger undertakings by greater combination of effort. As regards the destruction, now almost compelled, nothing but an alteration in the law will avail, and no proclamation of oyster beds being closed for one or more years will do more than produce a temporary benefit, since the same destroying influence will still be at work. Once the beds are in the hands of private companies or individuals, self-interest will protect them,—at present self-interest is employed in running a race of destruction. In England deep sea oysters are not allowed to be sold between May 14th and August 4th, but the shoal water oysters are protected between May 1st and March 1st. The Tasmanian law makes the close season one month longer, or from October 1st; but no amount of close season will compensate for the absurd practice of letting anybody dredge oysters for 10s. a year. On the other hand a systematic working of the beds would give employment to a far greater number of men than at present earn a livlihood by the trade, and they, like the Whitstable men, might become shareholders, or take shares as part wages. It is likely that there are many deep sea oyster banks; but who would, in the present state of the law, care to find one?

## 4TH. GENERAL REMARKS.

Although the foregoing remarks apply entirely to oysters, it may not be amiss to make a few observations about fisheries in general. In England fish of all kinds are yearly becoming dearer. Although it may be considered a matter of impossibility to exhaust the fish supplies of the boundless ocean (by those who have never given the matter thought), there is ample evidence that it is not only possible, but probable, that the fish supplies of Great Britain will fall short, though that very fact may save them from complete exhaustion.

As with oyster scalps, so with the haddock shore fishery, so also with the herring fishery. A commission was appointed to make enquiries as to the possible exhaustion of the fisheries of Great Britain, and their report stated that our "total fish supplies have *not* diminished, and that the fish supply of the United Kingdom admits of further augmentation, the limits of which are not indicated by any evidence we have been able to obtain;" but *Chambers* remarks:—"The Commissioners unfortunately omitted to take into account the enormous augmentation of the machinery of capture. In former times a line containing 800 hooks would, as a rule, catch 800 haddocks, but now a line of 800 hooks does not (as a rule) capture an eighth of that number. The public have been deceived by false reports of the inexhaustibility of our fish supplies, and are at length beginning to find that the increased machinery which has been brought into play for the capture of fish during late years is telling with deadly effect on the shoals.

Here in Tasmania are fisheries none of which except the oyster fishery has been quite ruined. Why should we not learn from experience? No doubt there is some difficulty attached to legislation on the subject, but that is the more reason why we should earnestly consider the matter. It seems to me that any other law than the present one relating to oysters would have had a more beneficial effect; it certainly was next to impossible to have framed one having more disastrous effects. If there had been a larger amount to pay for a licence, men would either not have engaged in the business, or if they had, it would have drawn attention to the profitableness of the trade. Had no licence been required, the outside public would have entered into competition with those whose

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 15TH JANUARY 1880.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

**Private Observatory, Hobart Town.**

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 29·945 | 64·0 | 18·0 | 72 | S | ·26 | 10 | KN | ·0 | Cloud, sky covered |
| 2 | 29·648 | 66·0 | 19·0 | 78 | S | ·26 | 8 | KN | ·0 | Sky cloudy |
| 3 | 29·879 | 63·0 | 17·5 | 59 | SE | ·26 | 5 | K | ·0 | Stars in Zenith |
| 4 | 29·717 | 64·0 | 18·0 | 72 | SW | ·0 | 10 | KN | ·0 | Cloud, sky covered |
| 5 | 29·758 | 66·0 | 19·0 | 68 | NW | 2·60 | 7 | K | 0 | Few faint stars |
| 6 | 29·745 | 56·0 | 13·0 | 82 | S | ·26 | 0 | O | ·0 | Starlight |
| 7 | 29·145 | 68·0 | 20·0 | 73 | W | ·50 | 8 | KN | ·0 | Few faint Zenith stars |
| 8 | 29·321 | 54·0 | 12·0 | 77 | SE | ·52 | 7 | K | ·0 | Stars at Zenith |
| 9 | 29·575 | 50·0 | 10·0 | 74 | NW | ·52 | 5 | K | ·25 | Stars round Zenith |
| 10 | 29·925 | 57·0 | 14·0 | 77 | N | ·52 | 6 | K | ·08 | Ditto stars faint |
| 11 | 29·978 | 61·0 | 16·0 | 77 | KN | ·0 | 9 | K | ·02 | Calm and cloudy |
| 12 | 29·452 | 68·0 | 20·0 | 78 | N | ·10 | 10 | K | ·01 | Cloud, sky covered |
| 13 | 29·245 | 59·0 | 15·0 | 82 | W | 2·60 | 10 | N | ·0 | Heavy rain |
| 14 | 29·675 | 56·0 | 13·0 | 58 | NW | ·52 | 7 | K | ·30 | Few stars at Zenith |
| 15 | 29·765 | 62·0 | 17·0 | 77 | NW | ·26 | 10 | KN | ·01 | Cloud, sky covered |
| 16 | 29·578 | 61·0 | 16·0 | 82 | O | ·0 | 10 | KN | ·0 | Calm and cloudy |

FRANCIS ABBOTT, F.R.A.S., etc. Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 16TH TO THE 31ST JANUARY, 1880.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

**Private Observatory, Hobart Town.**

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 17 | 29·925 | 65·0 | 18·5 | 73 | SE | ·0 | 10 | KN | ·08 | Cloud, sky covered |
| 18 | 29·945 | 61·0 | 16·0 | 77 | S | ·26 | 3 | K | ·0 | Stars at the Zenith |
| 19 | 29·948 | 68·0 | 20·0 | 68 | SE | ·0 | 10 | KN | ·0 | Cloud, sky covered |
| 20 | 29·445 | 86·0 | 30·0 | 78 | NE | ·0 | 10 | K | ·0 | Ditto, ditto, |
| 21 | 30·025 | 68·0 | 20·0 | 73 | SE | ·25 | 10 | K | 0 | Cloud, sky covered |
| 22 | 29·945 | 66·0 | 19·0 | 78 | SE | ·52 | 10 | K | ·0 | Cloudy, sky covered |
| 23 | 29·558 | 67·0 | 19·0 | 53 | S | ·52 | 10 | K | ·0 | Cloud, sky covered |
| 24 | 29·782 | 60·0 | 15·0 | 54 | NW | ·22 | 9 | K | ·0 | Moon and cloud |
| 25 | 30·101 | 57·0 | 14·0 | 71 | S | ·0 | 0 | O | ·0 | Moonlight, brilliant |
| 26 | 30·268 | 67·0 | 19·5 | 78 | SE | ·0 | 0 | K | ·0 | Sky cloudy |
| 27 | 30·175 | 66·0 | 19·0 | 73 | S | ·0 | 0 | O | ·0 | Moonlight |
| 28 | 30·147 | 67·0 | 19·0 | 88 | SE | ·52 | 6 | K | ·0 | Partial moonlight |
| 29 | 30·365 | 61·0 | 16·0 | 77 | S | ·26 | 10 | K | ·0 | Cloud, sky covered |
| 30 | 30·264 | 66·0 | 19·0 | 78 | S | ·52 | 8 | K | ·0 | Cloud by phases |
| 31 | 30·225 | 61·0 | 16·0 | 73 | S | ·26 | 5 | | ·0 | Moonlight |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.**—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

**FROM 1ST TO THE 15TH FEBRUARY, 1880.**

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

**Private Observatory, Hobart Town.**

**Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.**

***(Registered for the Royal Society, Tasmania.)***

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 30·128 | 71·0 | 22·0 | 76 | S | ·52 | 0 | O | ·0 | Starlight |
| 2 | 30·065 | 79·9 | 23·0 | 74 | NE | 25 | 5 | K | ·0 | Starlight |
| 3 | 30·056 | 60·0 | 19·0 | 60 | E | ·52 | 10 | K | ·0 | Cloud, sky covered |
| 4 | 29·921 | 71·0 | 22·0 | 83 | S | ·26 | 10 | K | ·0 | Cloud, sky covered |
| 5 | 30·126 | 64·0 | 18·0 | 82 | SE | 26 | 10 | K | 0 | Cloud, sky covered |
| 6 | 31·025 | 72·0 | 22·0 | 69 | S | ·0 | 10 | K | ·0 | Cloud, sky covered |
| 7 | 29·976 | 71·0 | 22·0 | 66 | S | ·26 | 0 | O | ·0 | Starlight |
| 8 | 29·954 | 74·0 | 23·0 | 74 | S | ·0 | 0 | O | ·0 | Starlight, brilliant |
| 9 | 29·965 | 68·0 | 20·0 | 73 | SE | ·26 | 10 | KN | ·0 | Cloud, sky covered |
| 10 | 30·028 | 68·0 | 22·0 | 78 | SE | ·26 | 3 | N | ·0 | Stars round Zenith |
| 11 | 30·134 | 70·0 | 21·0 | 78 | SW | ·52 | 10 | K | ·0 | Cloud, sky covered |
| 12 | 30·124 | 70·0 | 30·0 | 73 | SW | ·52 | 5 | K | ·0 | Cloudy |
| 13 | 29·863 | 69·0 | 26·0 | 78 | SW | 2·60 | 10 | K | ·02 | Change in weather, wind & rain |
| 14 | 29·821 | 66·0 | 16·0 | 82 | SW | 2·21 | 5 | K | ·02 | Few stars in the Zenith |
| 15 | 30·068 | 67·0 | 19·5 | 60 | — | calm | 5 | K | ·0 | Calm, and with few stars |

**FRANCIS ABBOTT, F.R.A.S., etc., Observe.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and clou proximately correct. The 7h. 30m. a.m. local time.**

## *METEOROLOGICAL OBSERVATIONS.*

FROM 16TH TO THE 29TH FEBRUARY, 1880.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* *Fahrenheit.* | *Thermometers.* *Centigrade.* | *Relative Humidity.* | *Wind.* *Direction from* | *Wind.* *Force in lb. per square foot.* | *Cloud.* *Amount.* | *Cloud.* *Character.* | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | p.c. | | | | | In. | |
| 16 | 30·325 | 61·0 | 16·0 | 77 | SE | ·52 | 10 | K | ·0 | Cloud, sky covered |
| 17 | 30·325 | 61·0 | 16·0 | 77 | SE | ·52 | 0 | O | ·0 | Starlight |
| 18 | 30·076 | 64·0 | 18·0 | 81 | S | ·26 | 3 | K | ·0 | Stars faint |
| 19 | 29·969 | 71·0 | 22·0 | 65 | SE | ·52 | 7 | K | ·0 | Moon & stars faint |
| 20 | 29·925 | 68·0 | 20·0 | 68 | SE | ·0 | 5 | K | 0 | Calm, moon and stars |
| 21 | 30·025 | 67·0 | 19·0 | 45 | 0 | ·0 | 10 | K | ·0 | Calm, and cloudy |
| 22 | 30·075 | 66·0 | 19·0 | 73 | S | ·26 | 10 | K | ·0 | Cloud, sky covered |
| 23 | 30·325 | 63·0 | 17·5 | 68 | S | ·26 | 10 | K | ·0 | Cloud, sky covered |
| 24 | 30·525 | 69·0 | 20·0 | 83 | NE | ·52 | 0 | O | ·0 | Moon and starlight |
| 25 | 29·927 | 74·0 | 23·0 | 74 | SE | ·52 | 10 | K | ·0 | Sky cloudy |
| 26 | 29·925 | 69·0 | 20·0 | 83 | SE | ·25 | 10 | K | ·11 | Sky cloudy |
| 27 | 29·725 | 65·0 | 18·0 | 100 | S | ·25 | 10 | K | ·55 | Heavy rain |
| 28 | 30·210 | 56·0 | 13·0 | 71 | SE | ·52 | 7 | K | ·0 | Cold S.E. wind |
| 29 | 30·172 | 57·0 | 14·0 | 75 | S | ·52 | 6 | K | ·6 | Squall and rain |

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## FROM 1ST TO THE 16TH MARCH, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 30·025 | 59·0 | 15·0 | 71 | SW | ·52 | 10 | KN | ·2 | Dark black clouds |
| 2 | 30·051 | 60·0 | 15·5 | 56 | S | ·26 | 0 | 0 | ·0 | Starlight |
| 3 | 29·945 | 66·0 | 19·0 | 88 | SE | ·0 | 10 | N | ·35 | Steady rain |
| 4 | 29·315 | 66·0 | 19·0 | 94 | S | ·25 | 10 | N | 1·0 | Heavy rain |
| 5 | 29·742 | 52·0 | 14·0 | 77 | SW | ·52 | 5 | K | ·0 | Stars at the zenith |
| 6 | 29·626 | 65·0 | 10·0 | 60 | W | .25 | 10 | KN | ·0 | Very dark |
| 7 | 29·620 | 66·0 | 19·0 | 73 | W | ·25 | 6 | K | ·0 | Stars at zenith |
| 8 | 29·921 | 62·0 | 16·0 | 73 | S | ·0 | 10 | K | ·0 | Cloudy, sky covered |
| 9 | 29·321 | 59·0 | 15·0 | 73 | W | ·25 | 7 | K | ·6 | Stars at the zenith |
| 10 | 29·042 | 62·0 | 16·0 | 63 | W | ·52 | 10 | K | ·1 | Cloud, sky covered |
| 11 | 29·745 | 59·0 | 15·0 | 71 | W | ·52 | 8 | K | ·0 | Cloudy, sky covered |
| 12 | 29·741 | 61·0 | 15·0 | 77 | W | ·25 | 10 | NW | ·0 | Cloud, sky covered |
| 13 | 30·145 | 61·0 | 16·0 | 88 | W | ·26 | 10 | KN | ·0 | Cloud, sky covered |
| 14 | 30·125 | 59·0 | 15·0 | 88 | S | ·0 | 0 | K | ·0 | Stars round zenith |
| 15 | 29·925 | 62·0 | 17·0 | 82 | S | ·0 | 4 | K | ·0 | Stars round zenith |
| 16 | 29·021 | 73·0 | 22·0 | 84 | NE | ·26 | 10 | KN | ·6 | Cloud, sky covered |

FRANCIS ABBOTT, F.R.A.S., etc., Observer.

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at *7h. 30m.* a.m. local time.**

# *METEOROLOGICAL OBSERVATIONS.*

## From 16th to the 31st March, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lb. per square foot.* | *Amount.* | *Character.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 17 | 30·220 | 65·0 | 18·0 | 83 | O | ·0 | KN | NK | 1·0 | Calm and cloudy |
| 18 | 30·125 | 64·0 | 18·0 | 73 | SE | ·25 | KN | 10 | ·0 | Cloud, sky covered |
| 19 | 29·925 | 65·0 | 18·0 | 83 | N | ·26 | KN | 10 | ·0 | Dark and Cloudy |
| 20 | 28·632 | 66·0 | 19·0 | 73 | SE | ·10 | KN | KN<br>10 | ·70 | Rain through the night |
| 21 | 27·742 | 62·0 | 17·0 | 88 | SE | ·25 | 0 | 0 | ·17 | Star and moonlight |
| 22 | 28·678 | 64·0 | 18·0 | 88 | N | ·10 | KN | 10 | ·30 | Steady rain |
| 23 | 29·041 | 55·0 | 15·0 | 87 | S | ·45 | K | 10 | ·0 | Cold wind and cloud |
| 24 | 29·921 | 55·0 | 15·0 | 70 | S | ·45 | K | 10 | ·03 | Sky cloudy |
| 25 | 30·000 | 59·0 | 15·0 | 88 | SE | ·26 | 10 | K | ·0 | Moon, and sky clouded |
| 26 | 30·058 | 56·0 | 13·0 | 76 | S | ·26 | 0 | 0 | ·0 | Clear, moonlight, full |
| 27 | 30·025 | 63·0 | 17·0 | 88 | S | .25 | 10 | K | ·0 | Cloudy, moonlight |
| 28 | 29·248 | 78·0 | 25·0 | 79 | SW | ·25 | 0 | 0 | ·0 | Moon and starlight |
| 29 | 29·624 | 71·0 | 21·0 | 86 | N | ·45 | 10 | KN | ·41 | Rain through the night |
| 30 | 29·728 | 56·0 | 16·5 | 71 | SW | ·41 | 10 | KN | ·15 | Squally |
| 31 | 31·145 | 55·0 | 14·0 | 71 | S | ·45 | 6 | K | ·02 | Cloud, few stars in zenith |

**Francis Abbott, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than *approximately* correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# METEOROLOGICAL OBSERVATIONS.

## From the 1st April to the 15th April, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| Day of Month. | Barometer corrected for Temp. Index Error and to Mean Sea Level. | Thermometers. | | Relative Humidity. | Wind. | | Cloud. | | Rain in 24 hours. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fahrenheit. | Centigrade. | | Direction from | Force in lb. per square foot. | Amount. | Character. | | |
| | | | | p.c. | | | | | In. | |
| 1 | 30·147 | 59·0 | 15·0 | 82 | S | ·06 | 6 | K | ·0 | Sky cloudy |
| 2 | 29·341 | 64·0 | 18·0 | 94 | SE | ·26 | 10 | KS | ·0 | Cloudy all day |
| 3 | 29·725 | 66·0 | 19·0 | 83 | E | ·26 | 10 | K | ·01 | Cloudy and sultry |
| 4 | 29·341 | 64·0 | 18·0 | 77 | SE | ·26 | 10 | KN | ·32 | Rain and cloud |
| 5 | 30·124 | 49·0 | 9·0 | 80 | SE | ·05 | 5 | K | ·0 | Faint stars and cloud |
| 6 | 30·025 | 61·0 | 15·0 | 72 | N | ·20 | 10 | K | ·0 | Stars brilliant in zenith |
| 7 | 30·025 | 62·0 | 17·0 | 72 | W | ·42 | 7 | KN | ·02 | Stars about zenith |
| 8 | 30·225 | 50·0 | 10·0 | 80 | SW | ·40 | 5 | K | ·0 | Stars about zenith |
| 9 | 30·416 | 50·0 | 10·0 | 78 | S | ·35 | 5 | K | ·0 | Stars at the zenith |
| 10 | 30·415 | 50·0 | 10·0 | 80 | S | ·26 | 4 | K | ·0 | Stars at the zenith |
| 11 | 30·520 | 49·0 | 9·0 | 80 | S | ·26 | 4 | K | ·0 | Stars at the zenith |
| 12 | 30·447 | 52·0 | 11·0 | 81 | S | ·30 | 4 | K | ·0 | Stars strong at zenith |
| 13 | 30·235 | 52·0 | 11·0 | 87 | S | ·05 | 4 | K | ·0 | Starlight at zenith |
| 14 | 30·125 | 62·0 | 12·0 | 77 | S | ·07 | 3 | KN | ·10 | Cloud, sky covered |
| 15 | 29·925 | 62·0 | 17·0 | 83 | S | ·06 | 4 | K | ·0 | Stars at the zenith |

**Francis Abbott, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# METEOROLOGICAL OBSERVATIONS.

FROM THE 16TH APRIL TO THE 30TH APRIL, 1880.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

Private Observatory Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* *Fahrenheit.* | *Thermometers.* *Centigrade.* | *Relative Humidity.* | *Wind.* *Direction from* | *Wind.* *Pressure wind amount.* | *Cloud.* *Amount.* | *Cloud.* *Character.* | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | p.c. | | | | | In. | |
| 16 | 30·225 | 58·0 | 14·0 | 88 | S | ·05 | 0 | O | ·0 | Moon and starlight |
| 17 | 30·127 | 61·0 | 16·0 | 88 | S | ·06 | 0 | O | ·0 | Moon and starlight |
| 18 | 30·000 | 67·0 | 19·0 | 79 | SE | ·00 | 10 | K | ·0 | Sultry and cloudy |
| 19 | 29·718 | 71·0 | 29·⅓ | 83 | W | ·25 | 10 | K | ·0 | Cloudy, sky covered |
| 20 | 30·125 | 70·0 | 20·⅓ | 69 | W | ·00 | 10 | K | ·0 | Cloud, sky covered |
| 21 | 30·128 | 54·0 | 12·0 | 76 | S | ·26 | 10 | KN | ·15 | Rain and squall |
| 22 | 30·254 | 52·0 | 11·0 | 67 | S | ·45 | 10 | N | ·16 | Squally |
| 23 | 30·145 | 53·0 | 12·0 | 56 | S | ·45 | 10 | KN | 1·75 | Rain all night |
| 24 | 29·734 | 55·0 | 13·0 | 88 | NW | ·25 | 10 | K | ·03 | Moon and cloud |
| 25 | 29·743 | 54·0 | 12·0 | 88 | NW | ·27 | 8 | K | ·0 | Cloudy, moon |
| 26 | 29·941 | 52·0 | 11·0 | 75 | SE | ·26 | 0 | O | ·01 | Moon, and stars clear |
| 27 | 30·023 | 50·0 | 10·0 | 86 | S | ·30 | 0 | O | ·01 | Moon, and stars clear |
| 28 | 29·921 | 55·0 | 13·0 | 88 | N | ·10 | 10 | KN | ·0 | Very dark |
| 29 | 29·521 | 56·0 | 13·0 | 94 | N | ·05 | 10 | KN | ·06 | Rain and cloud |
| 30 | 29·615 | 54·0 | 12·0 | 82 | N | ·26 | 0 | O | ·05 | Starlight brilliant |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.

# *METEOROLOGICAL OBSERVATIONS.*

## FROM MAY THE 1ST TO THE 16TH, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 1 | 30·027 | 50·0 | 10·0 | 87 | S | ·10 | K | 4 | ·01 | Starlight |
| 2 | 30·025 | 57·0 | 14·0 | 84 | W | ·00 | KN | 10 | ·0 | Very dark |
| 3 | 30·221 | 60·0 | 15·½ | 88 | W | ·00 | KN | 10 | ·0 | Cloudy, sky covered |
| 4 | 29·945 | 61·0 | 11·0 | 63 | W | ·00 | W | 5 | ·0 | Stars at the Zenith |
| 5 | 29·418 | 60·0 | 16·0 | 77 | SW | ·45 | K | various | ·03 | Wind, sleet, cloud |
| 6 | 29·935 | 50·0 | 15·0 | 70 | W | ·36 | K | 7 | ·70 | Squally snow and rain |
| 7 | 29·621 | 40·0 | 5·0 | 71 | W | ·48 | KN | 7 | ·50 | Squally wiud and rain |
| 8 | 29·932 | 43·0 | 6·0 | 74 | S | ·35 | KN | 10 | ·50 | Do., do., do. |
| 9 | 30·015 | 50·0 | 10·0 | 80 | S | ·20 | K | 7 | ·06 | Stars at the Zenith |
| 10 | 30·121 | 45·0 | 7·0 | 81 | S | ·25 | K | 7 | ·02 | White frost |
| 11 | 30·148 | 47·0 | 8·0 | 74 | S | ·24 | K | 4 | ·0 | Starlight brilliant |
| 12 | 30·125 | 48·0 | 9·0 | 87 | S | ·15 | K | 6 | ·35 | Stars at the Zenith |
| 13 | 30·048 | 47·0 | 8·0 | 80 | S | ·46 | K | 6 | ·02 | Stars on the Zenith |
| 14 | 29·921 | 50·0 | 10·0 | 81 | NW | ·25 | KN | 10 | ·0 | Cloudy and wind |
| 15 | 26·625 | 50·0 | 10·0 | 81 | NW | ·25 | KN | 10 | ·0 | Cloud, sky covered |
| 16 | 29·521 | 56·0 | 13·0 | 73 | W | ·00 | K | 8 | ·07 | Calm and cloudy |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than *approximately* correct. The rainfall is measured at 7h. 30m. a.m. local time.

## *METEOROLOGICAL OBSERVATIONS.*

### From May the 17th to the 31st, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* | | *Relative Humidity.* | *Wind.* | | *Cloud.* | | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *Fahrenheit.* | *Centigrade.* | | *Direction from* | *Force in lbs. per square foot.* | *Character.* | *Amount.* | | |
| | | | | *p.c.* | | | | | *In.* | |
| 17 | 29·521 | 56·0 | 13·0 | 73 | W | ·0 | K | 8 | ·07 | Calm and Cloudy |
| 18 | 29·645 | 48·0 | 9·0 | 74 | S | ·10 | K | 5 | ·15 | Faint moonlight |
| 19 | 29·621 | 48·0 | 9·0 | 80 | NW | ·10 | K | 10 | ·07 | Moon clouded |
| 20 | 29·245 | 50·0 | 10·0 | 80 | W | ·25 | K | 10 | ·38 | Cloud, sky covered |
| 21 | 29·325 | 56·0 | 13·0 | 82 | N | ·15 | K | 10 | ·03 | Cloud, sky covered |
| 22 | 29·748 | 46·0 | 8·0 | 81 | NW | ·15 | K | 7 | ·01 | Moonlight |
| 23 | 29·528 | 56·0 | 13·0 | 76 | NW | ·10 | K | 7 | ·0 | Cloudy, moonlight |
| 24 | 29·425 | 57·0 | 14·0 | 82 | NW | ·10 | K | 10 | ·0 | Moon and cloud |
| 25 | 29·745 | 57·0 | 14·0 | 70 | NE | ·25 | KN | 10 | ·04 | Cloud, sky covered |
| 26 | 29·925 | 54·0 | 12·0 | 88 | S | ·35 | KN | 10 | ·25 | Cloud, with rain |
| 27 | 30·140 | 52·0 | 11·0 | 71 | S | ·15 | KN | 10 | ·05 | Nimbus cloud |
| 28 | 30·021 | 54·0 | 12·0 | 81 | S | ·25 | KN | 10 | ·18 | Showery |
| 29 | 29·921 | 52·0 | 11·0 | 81 | S | ·25 | KN | 10 | ·10 | Frequent showers |
| 30 | 30·025 | 57·0 | 14·0 | 86 | SE | ·21 | K | 4 | ·01 | Starlight |
| 31 | 30·045 | 48·0 | 9·0 | 87 | NW | ·7 | K | 5 | ·01 | Stars at the Zenith |

**Francis Abbott, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

# METEOROLOGICAL OBSERVATIONS.

### FROM JUNE THE 1ST TO THE 16TH, 1880.

Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.

**Private Observatory, Hobart Town.**

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| Day of Month. | Barometer corrected for Temp. Index Error and to Mean Sea Level. | Thermometers. | | Relative Humidity. | Wind. | | Cloud. | | Rain in 24 hours. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Fahrenheit. | Centigrade. | | Direction from | Force in lbs. per square foot. | Character. | Amount. | | |
| | | | | p.c. | | | | | In. | |
| 1 | 29·945 | 50·0 | 10·0 | 81 | NW | ·4 | K | 4 | ·0 | Starlight brilliant |
| 2 | 31·148 | 50·0 | 10·0 | 72 | NW | ·10 | 7 | 7 | ·0 | Stars round Zenith |
| 3 | 32·026 | 53·0 | 12·0 | 76 | N | ·8 | KN | 7 | ·0 | Stars faint at Zenith |
| 4 | 30·452 | 50·0 | 10·0 | 81 | NW | ·25 | K | 8 | ·02 | Do., do., do. |
| 5 | 30·324 | 52·0 | 11·0 | 87 | N | ·8 | KN | 7 | ·0 | Do., do., do. |
| 6 | 29·516 | 50·0 | 10·0 | 81 | N | ·15 | KN | 10 | ·05 | Cloud and rain |
| 7 | 29·943 | 50·0 | 10·0 | 75 | N | ·17 | KN | 10 | ·02 | Cloud, sky covered |
| 8 | 29·745 | 57·0 | 14·0 | 76 | W | ·7 | KN | 10 | ·02 | Cloud, sky covered |
| 9 | 29·615 | 59·0 | 15·0 | 88 | W | ·55 | K | 7 | ·02 | Cloud, then stars |
| 10 | 30·036 | 50·0 | 10·0 | 72 | SE | ·40 | K | 6 | ·0 | Starlight round Zenith |
| 11 | 30·021 | 55·0 | 13·0 | 82 | W | ·0 | K | 5 | ·0 | Stars at the Zenith |
| 12 | 29·672 | 57·0 | 14·0 | 81 | W | ·0 | KN | 10 | ·0 | Cloud, sky covered |
| 13 | 29·526 | 56·0 | 13·0 | 66 | SW | ·25 | KN | 10 | ·30 | Cloud and rain |
| 14 | 29·425 | 47·0 | 9·0 | 70 | SW | ·26 | KN | 10 | ·07 | Cold and squally |
| 15 | 29·700 | 47·0 | 9·0 | 86 | SW | ·16 | K | 8 | ·02 | Cloudy, squally |
| 16 | 29·521 | 43·0 | 6·0 | 86 | W | ·25 | KN | 10 | ·45 | Squally |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

## *METEOROLOGICAL OBSERVATIONS.*

### FROM JUNE THE 17TH TO THE 30TH, 1880.

**Recorded daily at Hobart Town, Tasmania, at 10h. 33m. p.m., simultaneously with registration made at 7h. 35m. a.m., at Washington, United States, in pursuance of a proposition of the late Vienna Congress, for a system of International Synchronous Observations.**

Private Observatory, Hobart Town.

Lat. 42° 52′ 13″ S. Long. 9h. 49m. 29·2s. E.

*(Registered for the Royal Society, Tasmania.)*

| *Day of Month.* | *Barometer corrected for Temp. Index Error and to Mean Sea Level.* | *Thermometers.* |  | *Relative Humidity.* | *Wind.* |  | *Cloud.* |  | *Rain in 24 hours.* | *Weather.* |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | *Fahrenheit.* | *Centigrade.* |  | *Direction from* | *Force in lbs. per square foot.* | *Amount.* | *Character.* |  |  |
|  |  |  |  | *p.c.* |  |  |  |  | *In.* |  |
| 17 | 29·521 | 43·0 | 6·0 | 86 | W | ·25 | 10 | KN | ·45 | Squally |
| 18 | 30·125 | 42·0 | 6·0 | 80 | S | ·25 | 10 | KN | ·50 | Squally wind rain |
| 19 | 30·125 | 43·0 | 6·0 | 74 | S | ·25 | 10 | KN | ·30 | Showery |
| 20 | 30·145 | 47·0 | 8·0 | 80 | S | ·25 | 10 | KN | ·72 | Much rain, squally |
| 21 | 30·147 | 48·0 | 9·0 | 86 | S | ·25 | 10 | K | ·09 | Sky hazy |
| 22 | 30·326 | 49·0 | 9·0 | 81 | NW | ·0 | 0 | K | ·02 | Moon eclipse |
| 23 | 30·025 | 47·0 | 8·0 | 80 | NW | ·15 | 10 | K | ·0 | Sky cloudy |
| 24 | 29·648 | 45·0 | 7·0 | 74 | NW | ·07 | 10 | K | ·07 | Rain |
| 25 | 29·521 | 51·0 | 10·0 | 87 | NW | ·10 | 10 | K | ·02 | Dark and cloudy |
| 26 | 29·647 | 51·0 | 10·0 | 80 | N | ·0 | 10 | K | ·08 | Cloudy, rain |
| 27 | 30·021 | 44·0 | 7·0 | 74 | S | ·45 | 10 | K | ·02 | Stars at the Zenith |
| 28 | 30·021 | 51·0 | 13·0 | 81 | SW | ·0 | 10 | KN | ·06 | Cloud, sky covered |
| 29 | 30·024 | 47·0 | 8·0 | 87 | S | ·0 | 10 | KN | ·10 | Rain and cloud |
| 30 | 29·927 | 46·0 | 8·0 | 74 | SW | ·0 | 10 | KN | ·85 | Rain all night |

**FRANCIS ABBOTT, F.R.A.S., etc., Observer.**

**N.B.—The time of registration at Hobart Town, 10h. 33m. p.m., being after dark, renders it impossible to make the wind and cloud records more than approximately correct. The rainfall is measured at 7h. 30m. a.m. local time.**

Latitude 42° 40' 43" South. [illegible]

| Months. | Baro-meter. | Thermometer. | | | | | Humidity of Air. | | | Condensation. | | Evaporation. | Ozone | Clouds. | Winds. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | At sea level Temperature 32°. | Mean Temperature of two Daily Registers | Mean Temperature of max. & min. in shade | Mean Diurnal Range | Mean Solar Intensity. | Mean Terrestrial Radiation. | Dew Point, Mean position. | Humidity of Air per 100. | Elastic Force of Vapor per 1000. | Rain in Inches. | No. of Days on which Rain fell. | Spontaneous Evaporation in Inches. | Mean Daily Amount. | Mean Daily Amount. | Prevailing Direction. | Force in lbs. per sq. inch. |
| | | ° | ° | ° | ° | ° | ° | | | | | | | | | |
| January.. ... | 30·191 | 64·14 | 63·66 | 28·67 | 136·96 | 45·96 | 50·42 | ·61 | ·371 | ·34 | 6 | 6·26 | 3·58 | 4·79 | SE.W.NW | |
| February .... | 30·002 | 67·33 | 69·56 | 29·13 | 142·17 | 49·93 | 54·17 | ·63 | ·421 | ·59 | 4 | 5·97 | 3·60 | 4·94 | SE | |
| March ....... | 30·021 | 58·14 | 59·56 | 20·96 | 123·74 | 42·09 | 49·07 | ·72 | ·348 | 2·00 | 12 | 4·82 | 4·80 | 6·03 | W.SE | |
| April ........ | 30·175 | 55·03 | 56·44 | 22·55 | 114·65 | 38·13 | 50·92 | ·86 | ·373 | ·98 | 6 | 3·78 | 4·13 | 6·39 | W.SW.SE | |
| May ......... | 29·870 | 46·93 | 48·72 | 17·03 | 100·90 | 33·54 | 43·85 | ·89 | ·286 | 2·67 | 15 | 1·52 | 6·22 | 6·69 | NW.W.SW | |
| June ........ | 29·973 | 43·41 | 45·33 | 12·53 | 102·16 | 30·66 | 39·16 | ·87 | ·245 | 1·39 | 12 | 1·03 | 5·93 | 6·06 | W.NW | |
| July ........ | 30·059 | 42·17 | 43·93 | 17·93 | 104·25 | 28·64 | 38·04 | ·86 | ·228 | 2·08 | 12 | 1·47 | 6·00 | 6·59 | NW.W.SW | |
| August ...... | 29·680 | 45·27 | 46·98 | 16·93 | 102·40 | 32·03 | 40·20 | ·82 | ·249 | 5·94 | 20 | 1·04 | 6·30 | 6·24 | NW | |
| September.... | 29·939 | 49·68 | 50·61 | 18·90 | 114·33 | 33·75 | 41·64 | ·76 | ·265 | 2·07 | 16 | 3·25 | 6·22 | 6·12 | NW.W.SW | |
| October ...... | 29·850 | 51·78 | 50·20 | 23·33 | 122·67 | *35·14 | 41·20 | ·66 | ·259 | 1·70 | 13 | 3·48 | 4·74 | 5·53 | NW.W.SE | |
| November.... | 30·018 | 56·37 | 56·05 | 22·10 | 128·53 | 37·93 | 44·15 | ·64 | ·292 | 2·37 | 18 | 5·36 | 5·45 | 6·01 | SE.NW.W | |
| December.... | 29·840 | 60·14 | 60·14 | 25·00 | 130·00 | 40·61 | 46·62 | ·62 | ·326 | 1·06 | 10 | 5·81 | 5·40 | 5·74 | NW.W.SW | |
| Sums ........ | 359·548 | 640·44 | 651·18 | 255·20 | 1422·81 | 448·41 | 539·44 | 8·94 | 3·663 | 23·19 | 144 | 43·79 | 62·37 | 71·13 | W | |
| Mean for 1880. | 29·962 | 53·37 | 54·26 | 21·10 | 118·56 | 37·36 | 44·95 | ·74 | ·305 | 1·93 | 12 | 3·65 | 5·19 | 5·92 | W.NW.SE | |
| Mean for 1879. | 30·013 | 53·14 | 53·06 | 22·24 | 120·12 | 35·37 | 44·64 | ·75 | ·294 | 1·58 | 11·25 | 2·79 | 5·93 | 5·55 | NW.W | |
| Mean for 1878. | 29·927 | 52·87 | 53·04 | 20·93 | 116·88 | 36·48 | 44·52 | ·74 | ·282 | 2·32 | 12·50 | 4·01 | 7·26 | 5·90 | W.SE | |
| Mean for 1877. | 30·005 | 52·71 | 52·98 | 22.03 | 118·35 | 36·02 | 44·37 | ·75 | ·297 | 1·88 | 11·66 | 4·28 | 7·01 | 5·71 | W.SE | |
| Mean for 1876. | 29·887 | 52·92 | 51·18 | 21·61 | 116·37 | 37·12 | 45·22 | ·76 | ·308 | 1·96 | 11.41 | 4·10 | 6·81 | 5·49 | W | |
| Mean for 1875. | 29·863 | 54·62 | 53·65 | 21·33 | 116·34 | 37·09 | 45·99 | ·75 | ·320 | 2·34 | 14·41 | 4·03 | 7·31 | 5·56 | W.SE | |
| Mean for 1874. | 29·912 | 54·90 | 54·33 | 18·47 | 115·50 | 40·69 | 49·31 | ·84 | ·362 | 1·92 | 11·30 | 3·55 | 7·77 | 5·95 | W.SE | |

Total Rainfall for 1879, 19·01in. ; for 1878, 27·83in. ; for 1877, 22·63in. ; for 1876, 23·54in. ; for 1875, 28·17in. ; for 1874, 23·04in.

*Only 7 days.

W. E. SHOOBRIDGE

# REPORT

OF THE

# ROYAL SOCIETY

OF

# TASMANIA

FOR THE YEAR

1880.

Tasmania:
WILLIAM THOMAS STRUTT, GOVERNMENT PRINTER, HOBART.

1881.

# ROYAL SOCIETY OF TASMANIA.

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HER MAJESTY THE QUEEN.

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MR. T. ROBLIN.

**Superintendent of Gardens:**

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*Members who retire next in rotation.

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* Members who have contributed Papers which have been published in the Society's Transactions.

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*F. W. Hutton, Esq., F.G.S., C.M.Z.S., Professor of Biology, Canterbury College, Christchurch, New Zealand.
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* Fellows who have contributed Papers which have been published in the Society's Transactions. † Denotes Life Membership.

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*Abbott, F., jun., ditto.
Adams, G. P., ditto.
*Agnew, Hon. J. W., M.D., M.L.C., Fellow of the Linnean Society of New South Wales, ditto.
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Butler, Francis, ditto.
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Butler, Henry, F.R.C.S., Eng., ditto.
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Browne, Justin M'C., ditto.
Barclay, C. J., ditto.
Bedford, W., Anstey Barton.
Belstead, C. T., Hobart.
Belbin, W., M.H.A., ditto.
Benjafield, H., M.B., ditto.
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Bidencope, J., Hobart.
Butler, E. H., ditto.
Bailey, Rev. J. H. Brooke, ditto.
Barnard, C. E., M.D., New South Wales, ditto.
Brock, H. J., Campania.
Beddome, C. E., Hillgrove, Brown's River Road.
Burgess, W. H., M.H.A., Mayor of Hobart.
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Bethune, John C., Dunrobin.
Barnes, William, Trevallyn, Launceston.

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Creswell, C. F., ditto.
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Crosby, R., ditto.
Crowther, E. L., M.D., ditto.
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Dobson, H., ditto.
Dowdell, C., ditto.
Davies, R. L., ditto.
Dodds, the Hon. J. S., M.H.A., ditto.
Dobson, Hon. Alfred, M.H.A., ditto.

Elliston, C. H., ditto.
Evans, T. M., ditto.

Fysh, Hon. P. O., ditto.
Freeman, E. J., ditto.

†Gunn, R. C., F.R.S., F.L.S., Launceston.
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Gray, Rev. John, Glenorchy.
Grahame, W. H., Hobart.

Legge, R. V., Cullenswood.
Lucas, R. J., Hobart.
Latham, G. H., ditto.
Lovett, W., Colonial Auditor, ditto.
Lord, R. W., Launceston.

Maclanachan, Hon. James, Ballochmyle.
Macfarlane, James, Hobart.
Macfarlane, John, ditto.
Mather, J. B., ditto.
Maxwell, C. M., ditto.
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Marsh, H. J., ditto.
†Mace, G., Spring Bay.
Morris, W. V., Hobart.
Murphy, Most Rev. D., Bishop of Hobart.
Macmichael, Jno. C., ditto.
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Mason, Wm., M.R.C.S. Eng., ditto.

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Roberts, H. L., ditto.
Read, R. Cartwright, Redlands, New Norfolk.
Riddoch, A., M.H.A., New Norfolk.
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Reynolds, W. J. J., ditto.
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†Solomon, Joseph, Hobart.
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Salier, F. J., Hobart.
*Swan, John, ditto.
*Shoobridge, W. E., New Norfolk.
Shoobridge, E., ditto.
Simson, A., Launceston.

Scott, Hopton, Hobart.
Swan, E. D., ditto.
Sharp, J., ditto.
Shoobridge, R. W. G., New Norfolk.
Smith, C. H., Launceston.
Stone, T., Hobart.
Stanley, Captain, R.N., ditto.

*Travers, S. Smith, New Town.

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Weaver, W. G., ditto.
Whyte, Hon. James, ditto.
Wilson, George, Mount Seymour.
Wise, F. H., Hobart.
Webster, A. G., ditto.
Wright, Stephen P. H., Glenorchy.
Westbrook, G. C., Hobart.
Woodgate, E. W., Launceston.
Walker, James Backhouse, Hobart.
Wagenknecht, Albert, George's Bay.

Young, Russell, Hobart.

## Obituary.

## *MINUTES of the Annual General Meeting of the* ROYAL SOCIETY OF TASMANIA, *held at the Museum, Macquarie-street, at half-past Seven* P.M. *on Monday, 25th January*, 1881 ; JAMES BARNARD, *Esq., V.P., in the Chair.*

THE advertisement by which the meeting had been convened having been read, the Chairman called upon the Secretary to read the Annual Report.

The Report for 1880 was then read.

On the motion of Mr. Solomon, seconded by Dr. Crouch, the Report was adopted, and ordered to be printed for circulation amongst the Fellows.

The Hon. Secretary, Dr. Agnew, reported that the retiring Members of Council were Messrs. C. T. Belstead, T. Stephens, H. J. Buckland, and J. Barnard; that these names had been posted in the Library, agreeably to Rule 32; and that no other nominations had been received.

It was resolved that the retiring Members of Council be re-elected.

Messrs. F. Butler and John Macfarlane were again elected Auditors of Annual Accounts.

Dr. E. O. Giblin, Messrs. W. H. Grahame, J. C. Bethune, and James Grant were elected Fellows of the Society.

Dr. Agnew notified that, owing to his intended departure for Europe, he had resigned the Secretaryship of the Society; and that Mr. James Barnard had been duly appointed to the vacant office, in accordance with the provisions of "The Royal Society Act," 18 Vict. No. 4.

It was resolved, on the motion of Mr. Stephens, seconded by Mr. C. H. Grant, "That the best thanks of the Society were due to Dr. Agnew for his exertions on its behalf during the long term for which he had fulfilled the duties of Honorary Secretary."

Dr. Agnew returned thanks for the very warm and cordial manner in which the motion had been proposed and seconded.

# REPORT.

The session of 1880 opened on the 13th April, on which occasion the following papers were read:—"A description of twenty-two species of Algæ from the New Hebrides," by Dr. W. O. Sonder, of Hamburg; "On some Australian Slugs," by Prof. R. Tate, F.G.S., of Adelaide; "A contribution to our knowledge of the Unionidæ of the Launceston Tertiary Basin," by R. Etheridge, jun., F.G.S.; and the under-mentioned communications were brought forward at the various subsequent meetings:—"Description of a new species of Helix, found in a calcareous sandstone deposit at Kent's Group," by R. M. Johnston, F.L.S.; "On some Tasmanian Plants," by Baron Ferdinand Von Müeller, K.C.M.G.,; "On Queensland Lichens," by F. M. Bailey, F.L.S., and the Rev. J. E. Tenison-Woods, F.L.S., &c.; "On a collection of Fossil Fruits from the Black Lead, Gulgong, N. S. Wales," by C. E. Barnard, M.D.; "On some introduced Plants of Australia," by the Rev. J. E. Tenison-Woods, F.L.S., F.G.S.; "Oyster and other Fisheries," by Captain Stanley, R.N.; "A description of two new species of fish caught in an estuary of the Derwent," by R. M. Johnston, F.L.S.; "Introductory Notes to the Natural History of Tasmania," however, that arrangements will be made by which these observations will be resumed at no distant date, on a basis similar to that in the neighbouring colonies. The Society is indebted to Mr. W. E. Shoobridge for the results of his observations during the year; and the contributions from the light-houses and Mount Nelson have been received as usual. Two vacancies have occurred in the list of Vice-Presidents; the one by the absence from the colony of the Right Rev. Bishop Bromby, the other by the death of the Ven. Archdeacon Davies. His Excellency has been pleased to appoint His Honor Mr. Justice Dobson, and T. Stephens, Esq., M.A., F.G.S., to the offices.

## COUNCIL.

Two vacancies in the Council, also caused by the absence of the Bishop and the death of Archdeacon Davies, have been filled up by the election of Mr. Justice Dobson and Mr. C. H. Grant. The list of retiring Members has been posted in the library for the last three days, agreeably to Rule No. 33.

## FINANCE.

The income from all sources was as follows:—Government grant in aid to Museum, £200; to Gardens, £450; annual subscriptions, £145 10*s.*; special donations, £165 5*s.*; from Marine Board, £20; sale of plants, &c. at Gardens, £75 1*s.* 10*d.*; from Morton Allport Memorial Fund, £10 19*s.* This, with £30 12*s.* in the hands of the Superintendent of the Botanic Gardens for weekly payment of men's wages, and arrears of subscriptions £40, will give a total of £1137 7*s.* 10*d.* The expenditure with liabilities, as per balance sheet, amounted to £1145 2*s.* 5*d.*, leaving a balance to debit of £7 14*s.* 7*d.* It should be stated that, owing to the reduced amount for 1880 of the grant in aid to the Gardens, a deficiency of £25 on account of their working expenses was supplied by the Society. This advance, however, will be repaid during the year 1881, the grant having been restored to its former amount. It will be remembered that a fund collected to provide a memorial of the late Mr. Morton Allport was, in accordance with a resolution of the subscribers, invested for the purpose of procuring scientific works for the library. The first year's interest on this sum, amounting to £10 19s., has been received, and placed in the Savings' Bank for the purpose indicated.

### GARDENS.

The past year has been one of great financial difficulty. The grant in aid, which for some years previously had been £600, was reduced to £450 for 1880. This loss of income, taking place after various increases had been made in wages and salaries, completely upset existing arrangements. It became necessary in consequence to discharge the only skilled assistant, and to make other reductions, the effects of which have been detrimental in the highest degree; and, notwithstanding all possible reductions, it has not been found practicable to keep the expenditure within the income, the result being that the gardens, as shown by the balance-sheet, are indebted to the Society to the amount of £25 17*s*.

The Arboretum has been completed, with the exception of laying down the ground in grass. This will be proceeded with in the proper season, and the effect at no distant date will be that this locality will be one of the most attractive in the gardens.

Thanks are due to the donors of plants and seeds, and specially to Sir J. D. Hooker, Director of the Royal Gardens, Kew; Baron Ferd. Von. Müeller, Government Botanist, Melbourne; Messrs. H. Low & Co., London; W. R. Guilfoyle, Director Botanic Gardens, Melbourne; the Chamber of Agriculture, Washington, United States, &c. Thanks are also due to those captains of vessels who have furthered the interests of the gardens by the carriage of plant cases free of charge.

The gang of prison labour has been continued during the year, and has rendered material assistance in the rougher operations.

The estimated number of visitors for the year was 53,773.

## MUSEUM.

Mr. E. D. Swan has again given much time and attention to the ornithological collection, and has completed naming a large number of specimens. He has also bestowed a considerable amount of labour on cleaning and remounting the entomological specimens which had previously been distributed about the Museum in various small cases. The insects have been placed in glazed drawers, by which means they are rendered more readily accessible for inspection, and much less liable to injury. The whole of the Tasmanian fossils have been removed to the table cases in the large upper room for convenience of re-arrangement and classification; but it has not yet been found possible to make much progress with this important work.

A few new species of land and freshwater shells have been added to the collection. As on former occasions, Mr. Legrand has given his assistance in arranging the conchological specimens, and by his voluntary attendance has afforded material aid in keeping order in the upper rooms during the hours the Museum has been open to the public on Sundays.

The number of visitors during the year was,—on Sundays, 10,201; on week days, 9730; total, 19,931.

## the ROYAL SOCIETY OF TASMANIA *for the Year* 1880.

| £ s. d. | Expenditure. | £ s. d. | £ s. d. |
|---|---|---|---|
| | Jan. 20—Balance overdrawn at Commercial Bank, as per statement for 1879 | .. | 185 7 2 |
| | Interest on overdrawn account, 30th June, £4 15*s.* 5*d.*; 31st December, £4 0*s.* 7*d.* | .. | 8 16 0 |
| | *Royal Society.* | | |
| | Meteorological Instruments | 0 17 0 | |
| | Printing and Advertising | 55 9 0 | |
| | Postage, Parcels, &c. | 9 2 5 | |
| | Collector's Commission | 5 11 0 | |
| 341 14 0 | Messenger, extra work | 0 5 0 | |
| | Clerical assistance in completing Light-house Meteorological Tables | 20 0 0 | |
| 200 0 0 | Library Books, Stationery, &c. | 32 15 8 | |
| | Morton Allport Memorial Fund | 10 19 0 | |
| | *Total Royal Society* | | 134 19 1 |
| | *Museum.* | | |
| | Salary of Curator | 125 0 0 | |
| | Wages of Attendant | 52 0 0 | |
| | Wages for Sunday duty | 13 0 0 | |
| 525 1 10 | Premium of Insurance | 4 15 8 | |
| | Purchase & preparation of Specimens | 30 19 9 | |
| | Water Rate | 5 13 4 | |
| | Sweeping Chimneys | 0 10 6 | |
| | Fuel and Light | 4 7 3 | |
| | Sundries and Petty Cash | 2 13 0 | |
| | Ironmongery, Brushes, &c. | 4 13 10 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1881. | | | | | | |
| Jan. 13. | | | | | | |
| Balance overdrawn at Commercial Bank............. | .. | | | 63 | 6 | 7 |
| | | | | £1130 | 2 | 5 |

**Note.** *Dr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| To overdrawn balance at Bank....... | 63 | 6 | 7 | | | |
| Outstanding Accounts, including Wheatley & Co., London, estimated at | 15 | 0 | 0 | | | |
| | | | | 78 | 6 | 7 |

*Cr.*

| | | | | | | |
|---|---|---|---|---|---|---|
| By Cash in hands of Mr. Abbott for payment of Wages at Gardens......... | 30 | 12 | 0 | | | |
| Subscriptions due ................. | 40 | 0 | 0 | | | |
| | | | | 70 | 12 | 0 |
| Balance to Debit........ | .. | | | £7 | 14 | 7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Freight and Carriage of Specimens.. | 0 | 12 | 0 | | | |
| Fittings & Repairs, including timber | 5 | 7 | 7 | | | |
| *Total Museum*......... | | | | 249 | 12 | 11 |
| ***Botanic Gardens.*** | | | | | | |
| Salary Superintendent ............ | 200 | 0 | 0 | | | |
| Wages of Labourers .............. | 280 | 18 | 4 | | | |
| Tools and Repairs................ | 3 | 13 | 0 | | | |
| Freight and carriage of Plants...... | 9 | 6 | 6 | | | |
| Stationery and Stamps............ | 2 | 16 | 8 | | | |
| Horse Hire....................... | 6 | 0 | 0 | | | |
| Ironmongery, &c.................. | 16 | 18 | 4 | | | |
| Repair of Buildings, Timber, &c..... | 1 | 17 | 6 | | | |
| Seeds, &c. ...................... | 2 | 12 | 0 | | | |
| Sundries ........................ | 19 | 10 | 9 | | | |
| Water Rate ...................... | 3 | 3 | 4 | | | |
| Flower Pots ..................... | 1 | 15 | 0 | | | |
| Cartage, &c...... ............... | 0 | 12 | 6 | | | |
| Fuel ............................ | 1 | 15 | 0 | | | |
| *Total Botanic Gardens*... | | | | 550 | 18 | 11 |
| Stamped Cheque Book............ | .. | | | 0 | 8 | 4 |
| | | | | £1130 | 2 | 5 |

Audited and found correct.

JOHN MACFARLANE.
FRANCIS BUTLER.

21*st January*, 1881.

## MORTON ALLPORT *Memorial Fund*, 1880.

| £ | s. | d. | 1880. | **Expenditure.** | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| 10 | 19 | 0 | June 10. | By Pass Book ........................ | 0 | 0 | 6 |
| 0 | 1 | 6 | Dec. 31. | Balance in Savings' Bank to credit of Fund | 11 | 0 | 0 |
| £11 | 0 | 6 | | | £11 | 0 | 6 |

ANE.
R.

## *BOOKS and Periodicals purchased and presented during* 1880.

[Presentations marked thus *.]

Agricultural Gazette, The, current numbers.
Athenæum, The, ditto.
Arts, Journal of Society of, ditto.
* Astronomical Observations, Results of, taken at the Melbourne Observatory, 1871–75. From R. L. J. Ellery, Esq.
——————— Society, Royal, Monthly Notices, current parts.
* Abbey, Cupar, Registers of, vol. 2. From the Hon. J. W. Agnew, M.D.
* Amphiboda, on Australian, by W. A. Haswell, M.A. From the Author. (Pamphlet.)
* Association, British, Report, 1879.
* ————, Royal Historical and Archæological of Ireland, vol. 4, parts 36, 37, 38. From the Hon. J. W. Agnew, M.D.

Birds of Ceylon, Legge's, part 2.
* —-, on the Anatomy of, by W. A. Haswell, M.A., (Pamphlet). From the Author.

* Coast Survey, United States. Report, 1874, 1876. From United States Government.
* Crustacea, on the Australian Species Penæus in the Macleay Museum, Sydney, by Wm. A. Haswell, M.A., &c. From the Author.
* Coleoptera, Manual of the New Zealand, by Captain Thomas Brown. From Dr. Hector.
* Calendar, Adelaide University, 1880. From the University.
* Coal Field, Bowen River, Queensland, Report on, by R. L. Jack, F.G.S., &c., Geol. Surveyor, North Queensland.
* Catalogues, British Museum; Birds, vol. 4, New Species of Hymenoptera; New Species Lepidoptera. From the Trustees British Museum.
* Conchology, Journal of, current numbers. From the Publisher.

* Education, Report of Council of, New South Wales, 1878. From Royal Society, N. S. W.
* Eucalyptographia, by Baron Ferd. Von Müeller, K. C. M. G., &c., current parts. From the Author, on behalf of the Government of Victoria.
* Engineers and Shipbuilders in Scotland, Institution of, Transactions of, vol. 22.

Florist and Pomologist, current numbers.
* Free Trade and English Commerce, by Aug. Mongredien. From the Cobden Club.
* Flora of British India, part 7. From Sir J. D. Hooker, C.B., K.C.S.I.

Geological Magazine, current numbers.
* Geological and Geographical Survey of the Territories, United States, Bulletin, vol. 5, Nos. 2, 3.
* Geological Survey of India, Memoirs, vol. 16, part 1.
* ——————————, (Palæontologia Indica), Series 13, parts 1 and 2, vol. 4.
* ——————————, Records of, vol. 12, parts 2 and 3. From Government of India.

Geological Survey of India, Papers, by Robert Etheridge, jun., F.G.S.; viz.—"On an adherent Productus and a small Spiniferina." "On the Remains of a large Crustacean from Lower Carboniferous Series, Berwickshire." "On our present knowledge of the Invertebrate Fauna of the Lower Carboniferous or Calciferous Sandstone series of the Edinburgh neighbourhood." "On the Genus Dithyrocaris," &c. "Further remarks on adherent Carboniferous Productidæ." "Notes on Carboniferous Mollusca." "On the occurrence of a small and new Phyllopod Crustacean," &c. "Description of Palæozoic Corals from Northern Queensland." "New Carboniferous Mollusca." "Carboniferous and Post-tertiary Polyzoa." "Contributions to British Palæontology." "Notes on the Bivalves in the Gilbertson collection. "On Ramipora in the Caradoc." "On the Genus Cladochonus." "Additional species of Fossils from the Upper Silurian Series, Pentland Hills." "Notes on Silurian Fossils from Ayrshire." "On the swollen condition of Crinoid Stems." "Synopsis of known species of Australian Tertiary Polyzoa." Description of a section of the Burdiehouse Limestone," &c. List of titles of Scientific Reports and Papers. From the Author.

Grasses, Indigenous, of New Zealand, Manual of the, by John Buchanan. From Dr. Hector.

*Gold-fields, Charters Towers, Report on the. By R. L. Jack, F.G.S., F.R.G.S.

Institute, Royal Colonial, Proceedings, vol. 10. From the Institute.

*———, South Australian, Addresses delivered at laying of Foundation Stone, 1879. From the Secretary.

*Japan, Transactions of Asiatic Society of, 1879. From the Society.

Lincei, Real Accademia dei (Milan), publications of. From the Academy.

*Meteorological Memoirs, Indian, vol. 1, part 3.

——— ——— Department, Indian, Report, 1878-9.

——— ——— Observations, Indian, 1879. From H. F. Blandford, Esq.,

* Magnetical and Meteorological Observations, Batavia, vol. 4, 1879. From Government of Netherlands, India.

Natural History, Annals of, current numbers.
——————, of the Country round the head Great Australian Bight, by Prof. R. Tate. From the Author.
Nature, current numbers.
* New Zealand, Statistics for 1878. From N. Z. Government.
——————, Geological Survey of, Reports of Explorations, 1878–9. From Dr. Hector.
* Orchids, Fertilisation of, by C. Darwin, M.A., F.R.S. From Mr. E. D. Swan.

* Palæontology of Victoria, Prodromus of, parts 3 to 6, by Prof. M'Coy. From Government of Victoria.
* Pinnipeds, North American, History of, by Joel Asaph Allen. From the Author.
* Plants indigenous, in the neighbourhood of Sydney, by W. Woolls, Ph. D., F.L.S. From the Author.
* Proceedings of Royal Institution of Great Britain, vol. 8, parts 5 and 6. From the Institution.

* Reports, of Museum of Technology, of Council of Education, and Department of Mines, New South Wales. From the Royal Society, N. S. Wales.

Science, Monthly Journal of, current numbers.
* Sciences, Academy of Natural, Philadelphia, Proceedings, 1879, parts 1, 2, 3. From the Academy.
* Statistics of Tasmania, 1879.
* Society, Royal, of New South Wales, Journal, vols. 12, 13, 1878-9. From the Society.
* ———, Geological of London, Journal of, Nos. 138 to 140. List of Fellows, 1879. From the Society.
* ———, Linnean of New South Wales, Proceedings of, vol. 4, parts 3, 4. From the Society.
* ———, Royal Microscopical, Journal of. From the Society.
* ———, Entomological of Belgium, compte rendu, current parts.
* ———, Geological and Polytechnic of Yorkshire, Proceedings, vol. 7, part 2, 1879. From Society.
* ———, Zoological, London, Proceedings, 1878, part 4, 1879, parts 1, 2, 3. List of Animals in the Gardens, 1879. From the Society.
* ———, Royal Asiatic of Great Britain, Proceedings, vol. 2, parts 1 and 2. From the Society.
* ———, Leeds Philosophical and Literary, Report, 79-80.
* ———, Royal Geographical, Journal of, vol. 48, Proceedings, vol. 1, Nos. 3 to 12, vol. 2, part 1.
* ———, Linnean, Journal of, vol. 17, parts 101, 102, (Botany); vol. 14, Nos. 77 to 80, (Zoology).
* ———, Royal Astronomical, Memoirs of, vol. 44. From the Society.
* —————— of Victoria, Transactions, vol. 16. From the Society.
* ———, Royal des Sciences, Liege, Memoirs de la, tome 1.
* ———, Royal, London, Proceedings, vols. 28, 29, 30. From the Society.

* Transactions of Royal Historical Society, vol. 8. From the Hon. J. W. Agnew, M.D.

* Transactions of the Plymouth Institution, part 1879–80. From the Institution.

* Uranometria Argentina, Results of Astronomical Observations taken at the National Observatory, Cordoba, by Prof. B. A. Gould; 1 vol. and maps. From the author.

* Vegetable Kingdom, Lectures on the, by the Rev. W. Woolls, Ph. D., F.L.S. From the author.

* Wilson Hall, Proceedings on laying memorial stone of, October 2nd, 1879. From the Council of the Melbourne University.
* Wissenschaften, Akademie der (Munich), publications of, 1877, 1879. From the academy.
* Weather, Aids to study and forecast of Weather. Pamphlet.

* Zoologia et Palæontologia Miscellanea, by Prof. R. Tate. From the author.
* Zoology, Museum of Comparative, Harvard College, Cambridge, U.S. America, Bulletin, vol. 5, Nos. 15, 16; vol. 6, Nos. 1 to 7; vol. 7, No. 1. Reports of Curator, 1878–9. From the college.
* Zoological Exercises for Students in New Zealand, by Prof. F. W. Hutton. From the author.
* Zoology of Victoria, Prodromus of, by Prof. M'Coy. From Government of Victoria.

## DONORS OF PLANTS AND SEEDS TO THE ROYAL SOCIETY'S GARDENS, 1880.

*January*. From Messrs. Hugh Low & Co., Clapton Nursery, London—Case containing 60 plants, nearly all dead.

From the Sydney Botanic Gardens—Case containing 100 miscellaneous plants.

From the Royal Gardens, Kew, near London—Box containing 112 varieties willow cuttings, nearly all of which died.

*February*. From Baron Ferd. Von Müeller, Government Botanist, Melbourne—9 packets palm seeds.

*March*. From the Chamber of Agriculture, Washington, United States, America—36 packets seeds.

From W. R. Guilfoyle, Esq., Director Botanic Gardens, Melbourne—10 packets palm seeds.

From the Royal Gardens, Kew, near London—2 packets seeds.

From C E. Bethune, Esq., Sandy Bay—Box of orchids from Queensland.

From the Botanic Gardens, Saharunpore, N.W. Province India—11 packets seeds.

From Mr. Wm. Bull, New Plant Merchant, London—Box containing 59 varieties bulbs and tubers, and 24 packets seeds.

*May*. From Mr. Joseph Harris, South Yarra Nurseries, near Melbourne—Case containing 30 plants.

From Mr. G. Brunning, St. Kilda Nurseries, near Melbourne—Case containing 77 plants.

From the Royal Gardens, Kew, near London—Case containing 30 plants.

From Baron Ferd. Von Müeller, Government Botanist, Melbourne—2 packets seeds.

From H. J. Buckland, Esq.—28 varieties seeds from Canada.

*June*. From the Botanic Gardens, Melbourne—1 bundle containing 38 plants.

From L. A Bernays, Esq., Acclimatisation Society, Queensland—Roots Nymphæ Carulea.

From Baron Ferd. Von Müeller, Government Botanist, Melbourne—6 packets seeds.

From Messrs. Shepherd & Co., Sydney—18 packets seeds.

From Mr. C. F. Creswell, Melbourne—Case containing 19 varieties fuschia.

*August*. From John Browne, Esq., Launceston—6 Alsophila excelsa.

From the Acclimatisation Society, Queensland—Box seedling Coniferæ.

From the Horticultural Society, Melbourne—Collection fruit scions.

From Mr. John Smith, Nurseryman, Reddel's Creek, Victoria—Bundle plants and seeds.

*September*. Per *Ethel*—One case plants from Messrs. Hugh Low, London, in good condition.

From Mr. J. Latham, Liverpool-street—30 packets imported seeds.

From Mons. Ch. Huber, Ayres, France—14 papers Primula seeds.

*October*. From Mr. C. Latham, Liverpool-street—Collection imported seeds.

From Baron Ferd. Von Müeller, Government Botanist, Victoria—3 packets seeds.

From the Hon. the Colonial Secretary—Seeds of Vitis Californica, received from San Francisco.

*December*. From the Chamber of Agriculture, Washington, United States—8 papers seeds.

## DONATIONS OF PLANTS AND SEEDS SENT FROM THE ROYAL SOCIETY'S GARDENS, 1880.

*January*. To Messrs. Hugh Low, Clapton Nurseries, London—Case containing 100 Araucaria excelsa.

*February*. To Mons. J. Verschaffelt, Ghent, Belgium—6 tree ferns.

To Hugh Low, &c., Clapton Nurseries, London—6 tree ferns.

*March*. To Messrs. Veitch & Co., Royal Exotic Nursery, London—20 tree ferns.

*March*. To the Rev. R. H. Codrington, Norfolk Island—Box containing 36 plants.

To Mr. R. Harris, South Yarra Nurseries, Melbourne—Case containing 60 plants.

*April*. To Mr. S. Smith, Riddle's Creek, Victoria—Case containing 60 plants.

To Mr. J. Sangwell, St. Kilda Road, Melbourne—Case containing 40 plants.

To the Botanic Gardens, Sydney—Case containing 80 plants.

To the Botanic Gardens, Melbourne—Case containing 78 plants.

*May*. To Mr. G. Brunning, St. Kilda Nurseries, Melbourne—Case containing 56 plants.

*June*. To Messrs. Shepherd & Co., Darling Nurseries, Sydney—14 plants, 84 packet seeds.

To Mr. G. Brunning, St. Kilda Nurseries, Melbourne—46 packets seeds.

To W. R. Guilfoyle, Esq., Director Botanic Gardens, Melbourne—44 packets seeds.

To Mr. Joseph Harris, South Yarra Nurseries, Melbourne—44 packets seeds.

To Baron Ferd. Von Müeller, Government Botanist, Melbourne—144 packets seeds.

To Mr. C. F. Creswell, Seedsman, Melbourne—20 plants, 180 papers seeds.

To Mr. E. B. Heyne, Seedsman, Adelaide—173 papers seeds and 25 plants.

## PLANTS SUPPLIED FOR PLANTING PUBLIC PLACES DURING 1880.

Cornelian Bay Cemetery—40 plants Pittosporum.
Church of England Grounds, Torquay—50 plants.
The grounds, Police Office, Emu Bay—50 plants.
The grounds, Battery Point Sunday School—50 plants.
The Very Rev. Bishop Murphy, for church purposes—50 plants.
The Roman Catholic Church, Ouse—25 plants.
The Independent Chapel, Brighton—50 plants.
The Industrial School, Harrington-street—50 plants.
The grounds, Church of England, Richmond—25 plants.
The Corporation of Launceston—250 plants.
The Railway Reserve—12 Coniferæ, 50 Pittosporum plants.
The Macquarie-street entrance to Queen's Park—60 plants.

F. ABBOTT, JUN.

## LIST OF PLANTS INTRODUCED INTO THE ROYAL SOCIETY'S GARDENS DURING 1880.

Abies nobilis
Acer nigrum
Acer negundo alba variegata
Acer striatum
Agave Deserti
Azalea viscosa
Bignonia excelsa
Bomaria occulata
Bouvardia intermedia
Callarhoe macrorrhiza
Carya aquatica
Calceolaria pavoni
Castillegia indivisa
Cassia fistula
Ceanothus papillosus
Cerastium tomentosum
Cerasus padus
Cornus alternifolius
Cratægus rivularis
Cupressus Lawsoniana alba pendula
Cupressus Lawsoniana glauca
Daphne hyemalis
Dioscorea versicolor
Dolichodiera tubiflora
Eryngium aquifolium
Erythrina vespertilio
Eucalyptus bicolor
Eucalyptus gonyocalyx
Eucalyptus hemiophloia
Eucalyptus longifolia
Eucalyptus meliodora

Lilium martagon coccineum
Lilium Neilgherrense
Lilium pomponium
Lilium speciosum Kraetzeri
Lilium speciosum rubrum superbum
Lilium Washingtonianum
Myrica Californica
Nerium Madoni grandiflorum
Nerium Monsieur Balagnier
Nerium splendens variegatum
Omphalodes verna
Peristrophe lanceolata variegata
Punica granatum alba plena
Pyrus arbutifolia
Quercus cerris Fulhamensis
Quercus Hodginsoni
Quercus latifolia
Quercus lusitanica
Quercus Tauza
Retinospora leptoclada
Retinospora obtusa nana aurea
Rhamnus caroliniana
Rhamnus lanceolatus
Rhododendron elegans
Rhododendron fragrantissima
Rhododendron Jenkinsii
Richardsonia scabra
Rogiera gratissima
Salix fragilis Monspeliensis
Salix nigra
Salvia cacaliæfolia

### *Roses.*

Antoine Ducher
Boildieu
Captain Christy
Comte de Sereyne
Duke of Connaught
E. Y. Teas
Firebrand
Fisher Holmes
Felix Genero
François Treyve
François Michelon
Gabriel Tournier
General Von Moltke.
John Cranston.
Lord Clyde.
May Quennell.
Mademoiselle Marie Finger.
Miss Baker.
Niphetos.
Red Dragon.
Rosy Morn.
Souvenir de Poitray.
  Ditto Madame Hennecarfe.
Xavier Olibo.

### *Pelargonium.*

Aurora.
Brilliant.
Corsair.
Duchess of Bedford.
High Admiral.
Kathleen.
Lord of the Isles.
Mabel.
Magnificent.
Prince Leopold.
Rob Roy.
Sappho.
Triomphe de St. Maud.

### *Tricolor Pelargonium.*

Enchantress.
Gilt with Gold.
Lass o'Gowrie.
Mrs. H. Little.
Mrs. Harrison Weir.
Mrs. Mappin.
Peter Grieve.
Princess Alexander.
William Sandy.

### *Bronze-leaved Pelargonium.*

Bronze Queen.
Mrs. Elliot.
Prince Arthur.
W. R. Morris.

### *Zonal Pelargonium.*

Black Dwarf.
Bishop Wood.
Isa Gray.
Mirinda.
The Ghost.
The Shah.
William Margillon.
Veronia.

### *Chrysanthemum.*

Baverley.
Beethoven.
Clarissa.
Exquisite.
Finette.
Garibaldi.
Garnet.
Globe White.
Ossian.
Pio Nono.
Pink Pearl.
Sanguineum.
Splendens.
White Perfection.

### *Gloxinea.*

Boula de Feu.
Charm de Lutece.
Eustace Guilmot.
Mademoiselle Charlotte de la Tremouille.
William Robinson.